

SOUTHERN POWER AND INDUSTRY

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JULY, 1953

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It Can Happen - - and Has!

See Page 42



Get These **3** Low Maintenance Features

1 Wide Open Air Flow

No enclosed external air passages to clog. Easy to clean with cloth, brush, air hose or vacuum. Simply remove fan cover and whole radiating surface is exposed for inspection and cleaning.

2 Cast Iron Construction

Frame, conduit box and fan cover of cast iron resist corrosion. Fan is non-sparking, corrosion-resistant material. Well suited to outdoor operation.

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ALLIS-CHALMERS

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Volume 71

Number 7

3 Pre-lubricated Bearings

Ball bearings are double-shielded type, pre-lubricated at the factory. Periodic lubrication is not required under normal operating conditions, but provision is made for in-service lubrication if necessary.

GET COMPLETE INFORMATION on Allis-Chalmers motors for indoor and outdoor service — complete with Allis-Chalmers coordinated control — from your nearby A-C Authorized Distributor or District Office, or write for Bulletins 51B7286 and 51B7149, Allis-Chalmers, Milwaukee 1, Wisconsin.

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CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.



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A-4039



Photomicrograph of one type of silica scale in early formation stage. Further deposits will fill in between the "trees" to form a dense, glass-hard, insulating covering that is extremely difficult to remove—and impervious to usual water treatment techniques.

STONE FOREST

(The boiler scale that fought back)

● When silica scale was mentioned, water-treatment experts used to change the subject quickly . . . until a plant using The Nalco System began having scaling troubles due to high silica content of the raw water.

That was many years ago. Today, the same plant, operating at 135 psi, maintains 500 ppm (29.4 grains per gallon) silica in boiler water without scaling.

The Nalco research program that solved this low-pressure boiler water silica problem is a continuous one, so that today The Nalco System successfully meets the challenge of silica wherever it arises in the field of water conditioning.

Whether your water treatment problem is silica—or something even tougher—Nalco has the solution, or can put the full facilities of the Nalco Laboratories to work on it for you.

LATEST STUDY ON SILICA CARRY-OVER

At operating pressures over 400 psi another silica problem—that of silica carry-over—often arises. One of the 1951 ASME papers, "Correlation of Silica Carry-over and Solubility Studies" is an up-to-the-minute, informative discussion of this problem. You are welcome to a copy. Just write to National Aluminate Corporation.

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THE

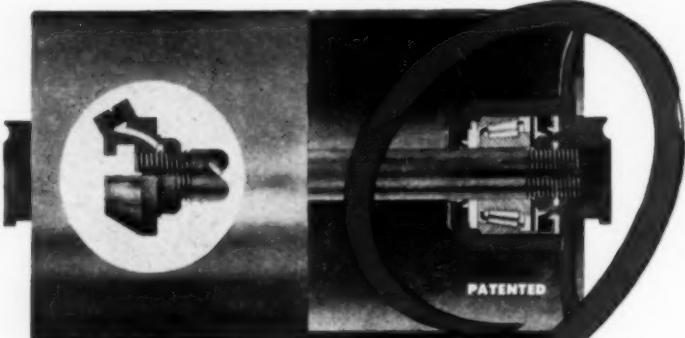
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NEW UST* Continental Idlers

* UNIT-SEALED PRE-LUBRICATED TIMKEN BEARINGS

Saves Grease!
Saves Labor!
Saves Belts!



UNIT-SEALED



PRE-LUBRICATED



TIMKEN BEARINGS

Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klozures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellent grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler without relubrication for 1-2-3 years depending upon the severity or character of conditions.

For detailed information on these idlers write
for Bulletin SI-116



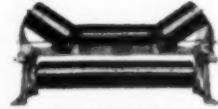
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SELF-ALIGNING FLAT BELT IDLER



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SOUTHERN POWER AND INDUSTRY

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No. 7

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1953

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Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

July, 1953

- NEW DEVELOPMENTS in super-critical pressures, higher temperatures and multiple re-heat will undoubtedly result in more economical generation of steam-electric power. A new boiler and turbo-generating unit designed to cross the barrier of "super-critical pressure" are on the design board.

G. E. will design and manufacture the 120,000 kw turbine and B&W the boiler. Turbine, at 4,500 psi, will operate at almost double the present highest steam pressure utilized for power generation. Initial steam temperature of 1,150 F will be 50 degrees above the present highest and will be followed by two stages of re-heat, the first at 1,050 and the second at 1,000 F.

Boiler will be the "once-through" type, in which water pumped at 5500 psi is changed into superheated steam in a single fast passage through the tubes in the boiler. The use of very high boiler pressure means that no boiler drum (normally the biggest and heaviest single item of equipment in a power plant and used to separate the bubbles of steam from the water) will be required. Re-circulating pumps will also be eliminated.

Entire \$12 million project is being engineered by American Gas and Electric Service Corporation, a subsidiary of American Gas and Electric Company. For additional information check the *Timely Comments* page in this issue.

- DUAL-PURPOSE CEILING DESIGN improves lighting and acoustics. Translucent corrugated ceiling of thin vinyl plastic is suspended below continuous rows of fluorescent or slimline light sources, spaced for uniform distribution. Plastic material comes in rolls 3 ft wide and is fastened to its supports at the ends so it may be easily removed and rolled up in sections, to provide quick access to light fixtures, air conditioning ducts, or valves that may be above the ceiling.

Acoustical correction in the Acusti-Luminus Ceiling is provided by perforated steel baffles affixed to the channels holding the ceiling. Baffles contain fibre glass absorption pads. Low maintenance is a feature — plastic is merely rolled up for washing and may be rehung to dry.

- PLATING WASTE TREATMENT by ion exchange has been one of the most attractive methods considered in recent years for the elimination of serious water pollution problems.

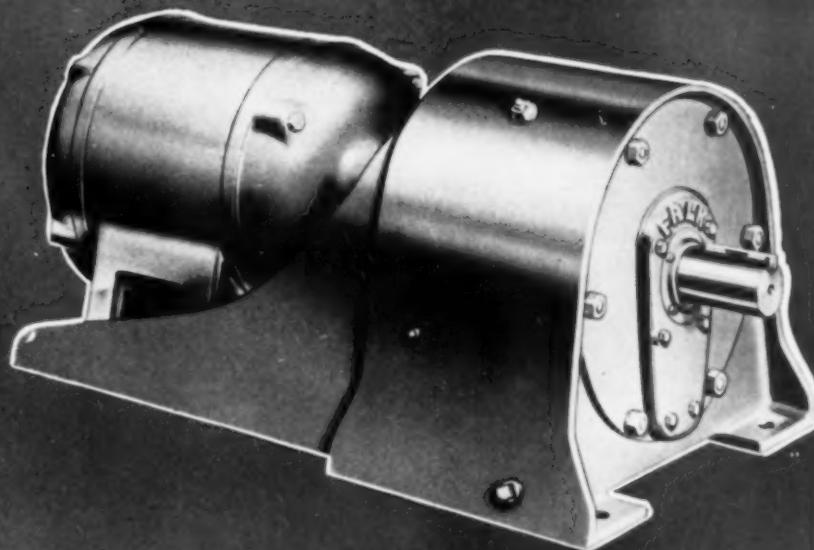
Most successful of the ion exchange processes applied to electro-plating waste recovery has been the use of cation and anion exchangers in the recovery of chromic acid. It has also been extended to the treatment of mixed chromate rinse water. Processes are economically most attractive in plants where a relatively few kinds of plating operations are performed and these are performed on a large scale.

The process greatly decreases the amount of rejects, eliminates or reduces sharply the amount of handling and buffing to remove stains
(Continued on page 6)

Choose the All-Motor type,

ALL-STEEL

FALK Motoreducer



...with complete
foot-mounted motor
of ANY make
ANY type
ANY speed

Every FALK
motoreducer
has these
"IN-BUILT"
FACTORS



Its exclusive, superior features mean LONG-RANGE ECONOMY!

You get more for your money in a FALK all-steel, All-Motor type Motoreducer. Here is the only compact motorized reducer with a separate foot-mounted, resilient Steelflex coupling-connected, standard motor without modifications! It accommodates any make, type, or speed of motor within the AGMA rating of the unit. Ratio can be changed within torque capacity of unit without modifying motor.

The simplified construction of the FALK All-Motor type Motoreducer means real long-range economy. Motors or reducer units can be quickly and easily interchanged from one line or plant location to another. Fully standard replacement motors from manufacturers' field stocks are always available without costly delivery delays or special motor or shaft modifications.

When you choose a FALK All-Motor type Motoreducer, you get the utmost in design, versatility of performance, and utility—plus the greatest possible dollar-for-dollar value throughout its traditionally long life... Available in any standard ratio from factory and distributor stocks throughout the country. Write for Bulletin 3104.

FALK

...a good name
in industry

THE FALK CORPORATION 3001 W. Canal St. Milwaukee 8, Wis.

1 **All-steel Housings.** Unbreakable, strong, rigid. Generous overhung load capacities provided by wide bearing spans, large shafts and bearings.

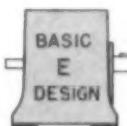
2 **Streamlined inside and outside.** Smooth, clean surfaces; machine welded construction conforms to NEMA motor frames.

3 **Sealed Housings.** Dual closures and one-way vents keep oil in, dust and moisture out. Units are splashproof, leakproof, dustproof.

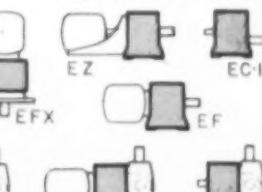
4 **Positive Lubrication.** Large sump capacity...oil-tight construction assures clean lubricant...direct dip of revolving elements provides positive lubrication at all speeds.

5 **Wide Speed Range.** Selective ratio combinations provide output speeds from 1.5 rpm to 1430 rpm with stock gears.

6 **Precision Gearing.** Heat-treated alloy steel, precision cut and shaved helical gearing throughout...quiet-operating crown shaved pinions...taper bored gears for easy ratio changes.



The basic E design permits maximum use of standardized parts...closer control over materials, processing, inspection and assembly...resulting in faster delivery from interchangeable stocked assemblies.



WRITE FOR BULLETIN 3104

facts and trends (continued from page 4)

and water spots, improves the corrosion resistance of the finished work, and for many operations, improves appearance of the work in process.

- SPRING-CENTER WIRE ROPE (with a coiled spring for its core) combines flexibility with the ability to resist crushing. Because of the void inside, the Jones & Laughlin wire rope provides a reservoir for lubricant, giving constant maintenance of lubrication. Spring at the center provides internal support for the outer strands when the rope is coiled. Core resists the crushing it is subjected to on drums, where it is wound layer upon layer. Spring centers can be used in wire ropes with diameters as small as 3/8 in. and as large as 2 in.
- CONTROL OF IRON PICK-UP by the use of Amine treatment, reported in this issue by Central Louisiana Electric Co., St. Landry, Louisiana, will be of special interest to operators of small, moderate pressure power stations.

Initial results were so encouraging that, following annual inspection, the company plans to start the same treatment in all units of the plant. Data presented will help other operators in deciding what they should do about corrosion of the steam and water systems in their plants.

- CERAMIC PLUNGERS FOR RECIPROCATING PUMPS, when properly packed, will run for months with little or no packing adjustment and greatly extend packing life. The ceramic material is as hard as tungsten carbide and resists abrasive wear as well as scoring from abrasive particles embedded in the plunger packing. Worthington Corporation emphasizes that the ceramic material will successfully withstand the corrosive effects of all liquids but strong alkalis and hydrofluoric acid and is superior to the best grades of chemical porcelain.
- HIGHER STEAM PRESSURES demand make-up water of minimum and preferably no mineral solids. In the past such a quality of water could be obtained only by evaporation. Demineralization by ion exchange is now available to produce the equivalent of distilled water.

It accomplishes the same result as evaporation but differs greatly in the method of accomplishment. The evaporator removes the water as vapor from the mineral solids which concentrate in the evaporator, whereas demineralization removes the solids by ion exchange.

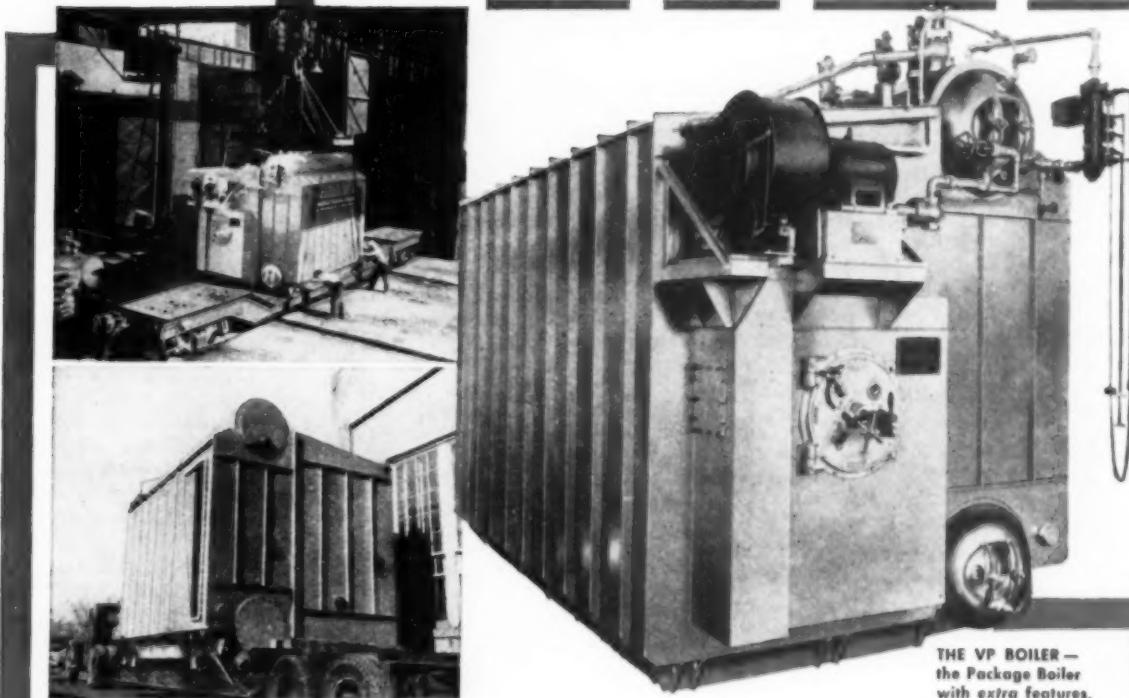
The rapid acceptance of demineralization by ion exchange was noted in SP&I for May, pages 74-78. The system may be operated continuously at its rated capacity if demanded, regardless of the rate at which the turbine operates. An automatic 180,000 gph demineralizing plant is now being installed at Gulf States Utilities. Another installation (96,000 gph) at Shell Oil Company, Houston, will be featured in an early issue.

Two types of power plants are especially interested in demineralization (1) The steam power plant designed exclusively for the manufacture of electrical power. This is a surface condensing plant and requires only a small percentage of make-up. (2) The plant which produces by-product power with high pressure turbines which supply exhaust steam for process.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

4 reasons why...

THE VP PACKAGE IS YOUR BEST BOILER BUY



THE VP BOILER —
the Package Boiler
with extra features.

1 Fully Water-Cooled Furnace — More cooling area per cubic foot of furnace volume than any other boiler of the VP's size and type. In all but the three smallest sizes, the VP Boiler has water-cooled walls on *all six sides* — including the burner wall. Assures rapid, efficient heat absorption. Minimizes furnace maintenance.

2 Larger Lower Drum — The 30 in. diameter lower drum permits a simple, symmetrical tube arrangement . . . provides easy access for washing down or inspection . . . its greater water storage capacity facilitates the handling of fluctuating loads.

3 Simple Baffle Arrangement — Minimum changes in direction — no baffle at all in convection bank in larger VP Boilers. This means lower draft loss . . . simplified soot blowing . . . elimination of dead pockets, thus, maximum heat pick-up. In the intermediate sizes, a water-cooled baffle assures minimum maintenance.

4 Centrifugal Fan — This more efficient type of fan operates at lower speed than other types and is quiet in operation. In fact, its average noise level is less than half that of typical high-speed blowers used in most package boilers.

These four *extra features* are yours *only* in the VP Boiler which is designed and manufactured by Combustion — maker of many of the world's largest boilers. These units are available in capacities ranging from 4,000 to 30,000 lb of steam per hr, and pressures up to 250 psi.

Complete details on the C-E Package Boiler, Type VP, are available to you. Send for your free copy of Bulletin VP-141.

B-666A



COMBUSTION ENGINEERING, INC.

200 MADISON AVENUE, NEW YORK 16, N. Y.

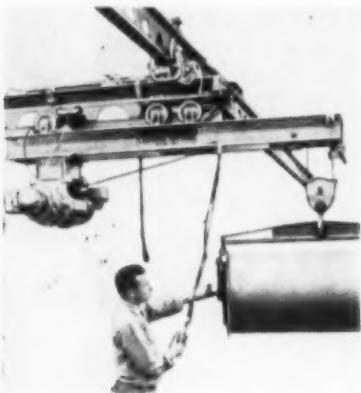
ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT

Equipment . . Supplies . . Methods

for the plant engineer and operating force

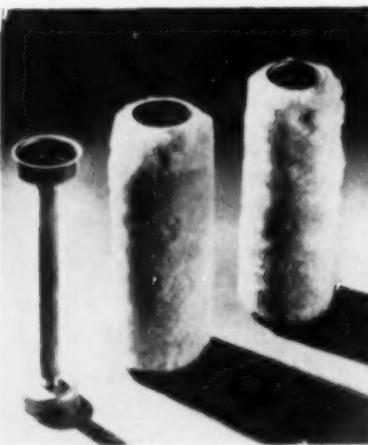
Handling Around Pillars With Tramrail Cantilever Carrier

G-1 CLEVELAND TRAMRAIL DIVISION, The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a new type overhead carrier with a cantilever arrangement that permits the unit to



Heavy-Duty Paint Roller

G-2 THE AMERICAN PRODUCTS Co., 3308 Edson Ave., New York 69, New York, are marketing a new heavy-duty paint roller, consisting of extra high pile



handle loads beyond the end of the crane on which the carrier operates.

The carrier was designed especially to take care of situations requiring the handling of materials in areas between roof-supporting pillars that cannot normally be covered by cranes, and, also, for reaching through doorways.

This unit has a capacity of 1500 lb. Other cantilever carriers of different load capacities and reach can be made to suit conditions involved.

1500 lb loads are easily handled beyond the end of a crane with this Cleveland Tramrail cantilever carrier. Where transfer cranes are employed, the carrier with its load can be transferred from one to the other.

lambs' wool attached to a strong core of paper impregnated with Bakelite phenolic resins. The resins make it resistant to solvents, paints and thinners.

The rollers are designed for rapid painting of walls, ceilings, floors,



Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

Air Line Filter

G-3 C. A. NORGREN CO., 3400 South Elati St., Englewood, Colo., has introduced a new air line filter with automatic drain, which will operate under constant or fluctuating air pressure and with or without air flow, which means the drain will operate around the clock as long as there is pressure on the air line.

According to the manufacturer, the filter is especially suited to air lines located in hard-to-reach places, or wherever efficient removal of liquids and solids from compressed air lines is required, and where manual draining is not desirable or practicable.

structural steel and other large areas in marine and heavy industry. Paint can be rolled on most surfaces from a standing position on a floor or dock, as the industrial roller is easily fitted to an extra-long pole. This reduces the need for ladders and scaffolds, thus eliminating much unproductive time for moving and adjustment, inherent hazards, and interference with other work.

More surface can be covered in less time with the larger-diameter roller which comes in 9, 14 or 18-in. widths and holds more paint than a conventional roller or brush.

Oil, water or rubber-base paints can be rolled on all types of surfaces, including metal, wood, plaster, cement, stucco, plastic and composition board.

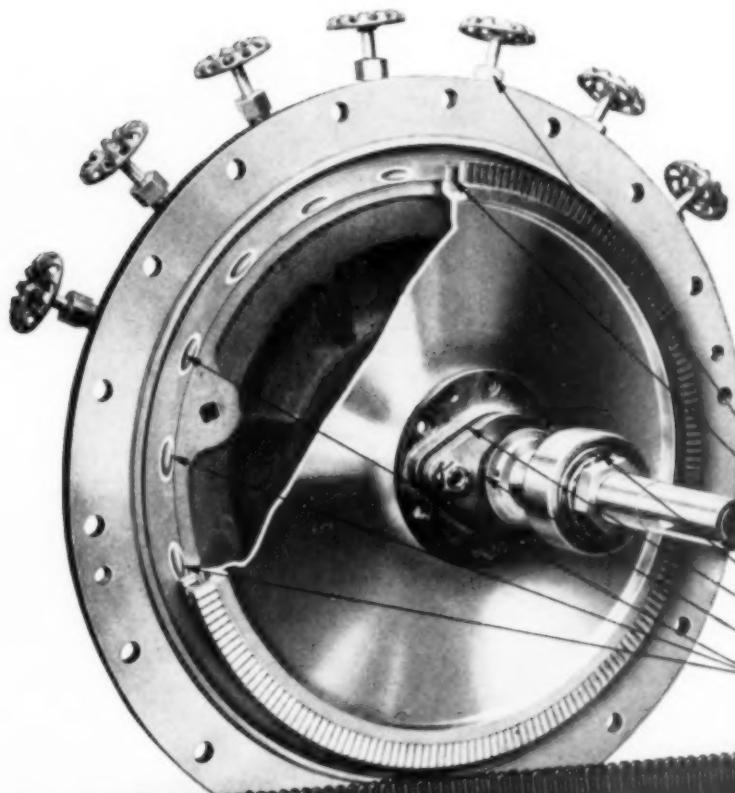
New heavy-duty paint roller (left) has extra high pile lambs' wool attached to core of paper impregnated with Bakelite phenolic resins. Paint can be rolled on most surfaces from a standing position.

(Continued on page 10)

*No other steam turbine
offers you*

**SUCH VERSATILE
STEAM NOZZLE CONTROL**

The larger number of hand valves you see on a Coppus Steam Turbine promises you greater operating economy. At least 60% of the steam nozzles can be individually controlled to give maximum steam pressure in steam chest . . . a guarantee of best water rates at any load. Maintenance economy, too, is assured by the hard chromium plating of the shaft at the stuffing box. It provides the best possible smooth, non-corrosive surface for packing rings.



Coppus Steam Turbines, Type TF, driving chemical transfer pumps at Celanese Corporation of America's Chemcel Plant

Coppus Steam Turbines ranging from 150 hp down to fractional in 6 frame sizes

**MAKE TURBINE DOLLARS
GO FARTHER**

Why waste money buying turbines with higher horsepower ratings than you need? The higher the horsepower rating, the higher the price. Save money by selecting the Coppus Turbine size closest to your requirements from 150 hp down to fractional. And when you do, you save operating and maintenance costs, too. That's what these other Coppus features are designed to do: exclusive pilot operated excess speed safety trip supplementing constant speed governor; choice of metallic or carbon ring packing assemblies. Designs available for back pressures up to 75 pounds; replaceable cartridge type bearing housings. For full details . . .

WRITE FOR BULLETIN 135

COPPUS ENGINEERING CORP.,
247 Park Avenue, Worcester 2, Mass.
Sales offices in THOMAS' REGISTER.

7 hand valves for efficient partial load operation,
(20" turbine shown)

2 row velocity-stage turbine wheel with stainless
steel turbine buckets — statically and dynamically
balanced

30-40 carbon steel shaft

Oversized double row deep grooved ball bearing

Stuffing box with metallic packing ring

Heavy chrome plating of shaft through stuffing box

3 nozzles always open

COPPUS "BLUE RIBBON" TURBINES

Equipment . . Supplies . . Methods (Starts on Page 8)

Vises With Replaceable Jaws

G-4 THE COLUMBIAN VISE & MFG. CO., 9018 Bessemer Ave., Cleveland 4, Ohio, has announced a variety of special vise jaw faces for use with standard machinists' vises.



It's easy to insert any desired type of special jaw face in a Columbian machinists' vise.

These include smooth jaw faces of hardened steel to protect soft materials and finished surfaces and copper non-sparking, non-magnetic faces. Special faces, designed and machined out to fit irregular shaped pieces, are also available. Any of the special faces can be easily inserted in the company's machinists' vises. The latter are manufactured with replaceable jaws which can be easily removed for the installation of new faces or the replacement of worn faces.

Bench-Type Undercutter

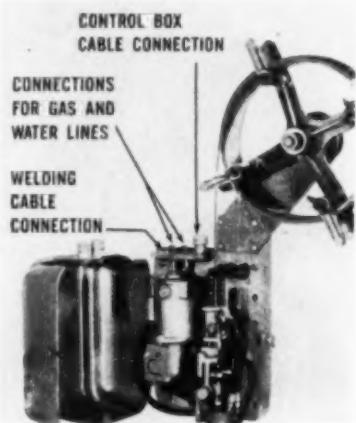
G-5 MARTINDALE ELECTRIC CO., 1334 Hird Ave., Cleveland 7, Ohio, has introduced an entirely new undercutter that undercuts both horizontal and vertical commutators, and is designed for large volume production undercutting of the motor manufacturer as well as the wide variety of undercutting requirements encountered in the service shop.



Features and specifications include: Carriage travels on ball bearings both horizontally and vertically; undercuts horizontal commutators up to 6½ in. diameter, 6½ in. long. Undercuts vertical commutators up to 6 in. diameter; has 20 in. between centers—one center is spring-loaded but may be locked for heavy work; V-supports are provided for longer shafts; have 1 in. vertical adjustment; and handles armatures 12 in. in diameter on V-supports, 10½ in. diameter on centers.

Welding Machine Features Arc Voltage Control

G-6 LINDE AIR PRODUCTS COMPANY, 30 E. 42nd St., New York 17, N. Y., announces a new, lightweight sigma (shielded inert gas metal arc) welding machine, which features are voltage control.



Wire is fed automatically through the nozzle of Linde's new sigma welding machine. Control eliminates problems caused by fluctuating voltage.

Electronic controls maintain the proper balance of welding conditions by instantaneously speeding up or slowing down welding wire feed rate as required by changing arc conditions.

The unit does not get in the way of the welding operator or other work going on in the shop, and it does not have to be moved with the welding machine from one job to another. It can be permanently mounted anywhere, as long as it is properly connected to the welding machine.

All that the welding operator needs

to do is preset the required voltage, and throw the starting switch. A retract starter built into the electronic control unit does the rest.

Spring-Center Wire Rope

G-7 JONES & LAUGHLIN STEEL CORPORATION, Gateway Center, Pittsburgh 30, Pa., has announced development of wire rope construction which employs the ability of a coiled spring core to flex and to resist crushing.



The new J & L wire rope with a coiled steel spring for its core combines flexibility with the ability to resist crushing.

Because of the void inside, this type of wire rope provides a reservoir for lubricant, giving constant maintenance of lubrication. The spring at the center provides a firm internal support for the outer strands when the rope is coiled. The core resists the crushing it is subjected to on drums, where it is wound layer upon layer.

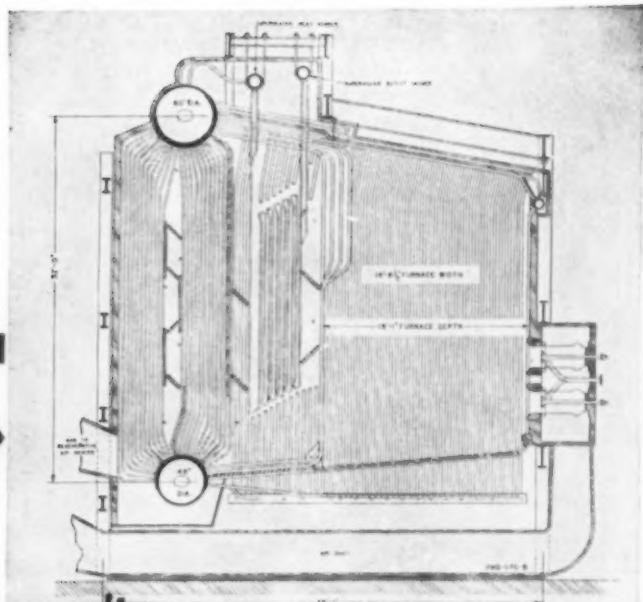
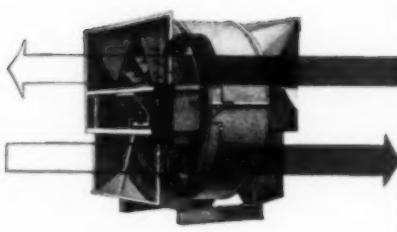
Spring centers can be used in wire ropes with diameters as small as $\frac{1}{8}$ in. and as large as 2 in. They can be used in any type or construction of wire rope.

Dust Control System

G-8 CALLAWAY MILLS, INC., 295 Fifth Ave., New York 16, N. Y., has introduced a new dust control system that saves as much as 25 per cent of the time formerly spent in dusting and sweeping, and is now available to industrial plants.

The new Kex dust control system, which is provided on a rental service to users, involves no investment in

(Continued on page 106)



**3,375,000 pounds of steam capacity
at Kaiser Aluminum & Chemical Corporation**

equipped with

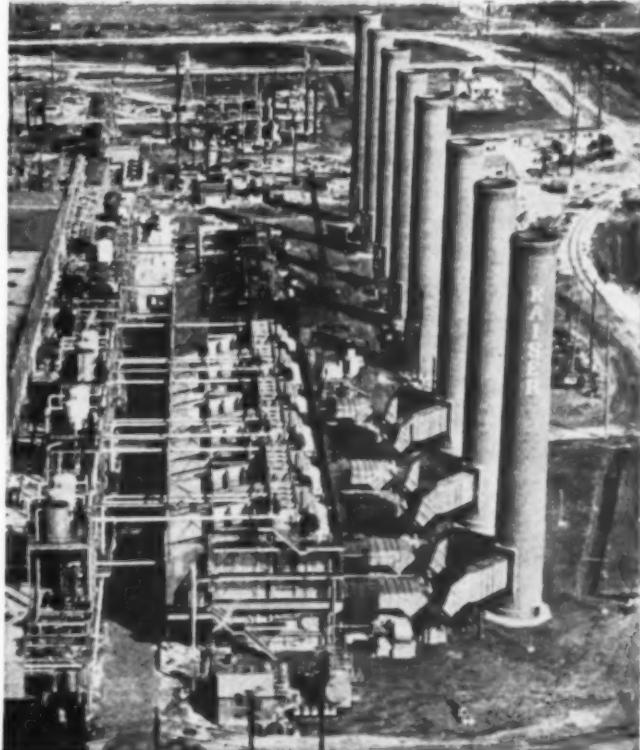
LJUNGSTROM AIR PREHEATERS

Four hundred million pounds of aluminum annually will be produced at the new Kaiser Aluminum & Chemical Corporation plant at Chalmette, La., when it is operating at full capacity. Designed and built by Kaiser Engineers, Division of Henry J. Kaiser Company, this plant will help meet the ever growing demand for aluminum products, both civilian and military.

Because it takes roughly 10 kwh of electricity to produce one pound of aluminum, the electrical generating capacity at this large new plant must be enormous. Therefore, when the plant is completed, it will have a total capacity of nearly 500,000 kw, of which 375,000 kw will be steam-generated.

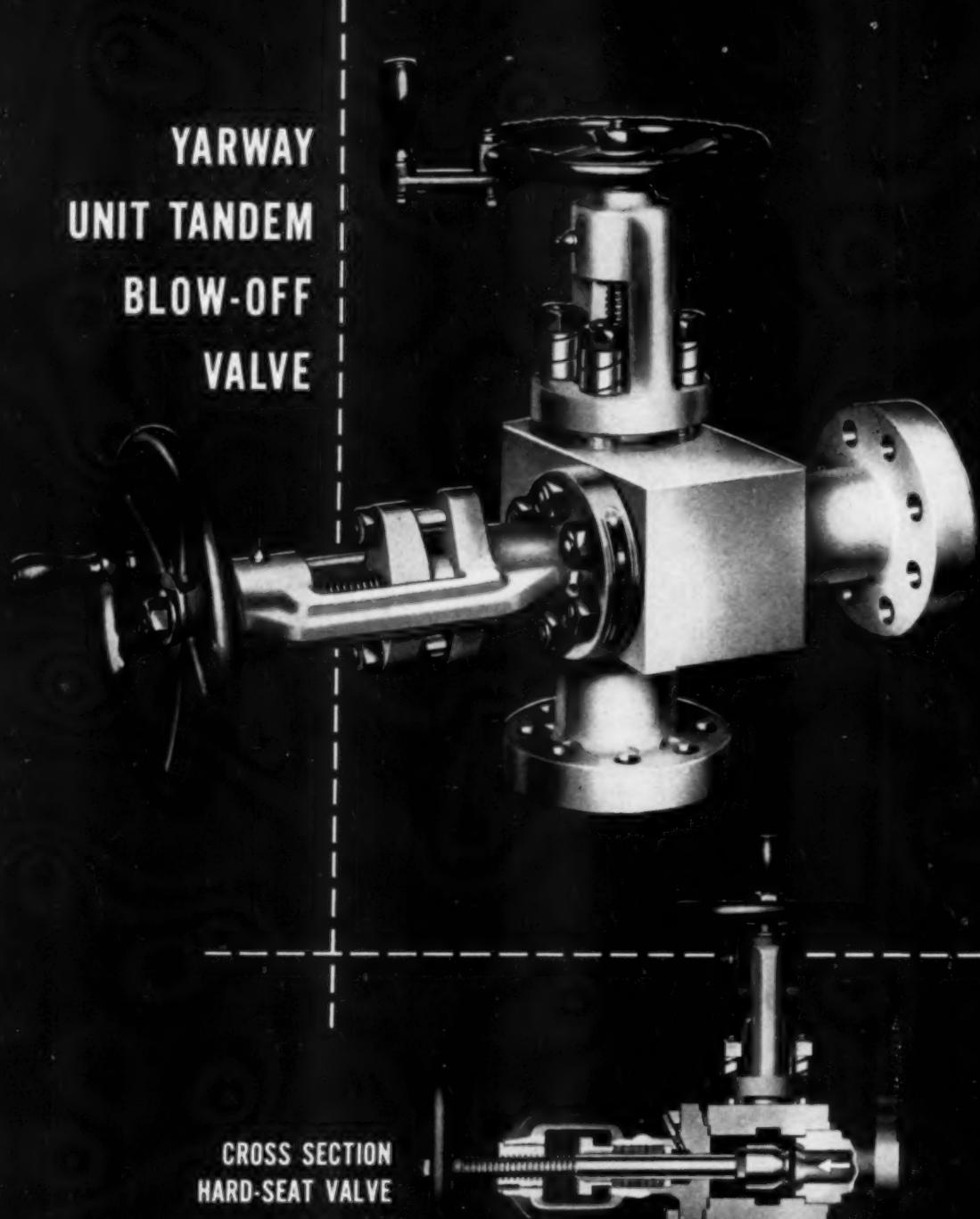
The plant's vast steam requirements are met by fifteen Foster Wheeler steam generators, each with a maximum continuous capacity of 225,000 lb of steam per hr at 900 psi and 905 F. Each boiler incorporates a Ljungstrom Air Preheater, which cools exit gas to 320 F, and preheats incoming combustion air to 540 F.

The Ljungstrom Air Preheater—chosen again and again where steam generation must be efficient—can serve you, too. Its wide acceptance by utilities... by consultants... by industrial plants all over the world is your assurance that the Ljungstrom is truly the most economical heating surface on the modern boiler.



THE Air Preheater Corporation 60 East 42nd St., New York 17, N.Y.

YARWAY
UNIT TANDEM
BLOW-OFF
VALVE



CROSS SECTION
HARD-SEAT VALVE

Cross Section through
hard-seat (blowing) valve
in open position. Note
stellite-faced seat and
disc.

RUGGEDNESS

... WHERE YOU NEED IT

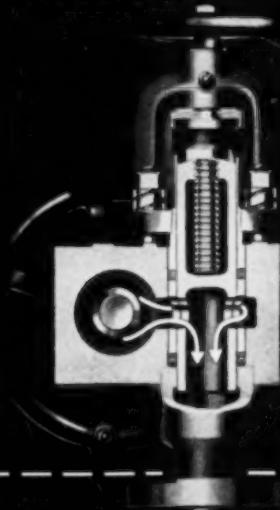
A one-piece forged steel block serves as the common body for both valves in Yarway Unit Tandem Blow-Off Valves.

You get rugged strength where you need it... added protection for your high pressure boilers.

Whether in times of emergency, normal blow-down service, or acid washing, this high safety factor is a source of satisfaction to boiler plant operators.

Yarway Unit Tandems combine all advancements of modern metallurgy with experienced design and skilled workmanship. The result—**DEPENDABLE PROTECTION**.

CROSS SECTION
SEATLESS VALVE



Cross Section through seatless (sealing) valve in open position. (On pressures over 1500 psi two hard seat valves are recommended.)

POSITIVE ACTION

... WHEN YOU NEED IT

When putting high pressure boilers on the line, or in times of emergency, you need positive action at the blow-off valves.

With Yarways you have it.

Both the hard seat-seatless combinations and the hard seat-hard seat combinations provide positive opening and closing with drop-tight shut-off. Open yokes permit visual indication of the disc position in the hard seat valve and of the plunger in the seatless valve.

These are some of the reasons why *more than 4 out of every 5 high pressure plants in the United States are Yarway-equipped... and among boiler plants of all pressures, more than 16,000 are Yarway-equipped*

Write for your free copy of Yarway Blow-Off Valve Bulletin B-425 (pressures to 400 psi) or Bulletin B-433 (pressures to 2500 psi).

YARNALL-WARING COMPANY

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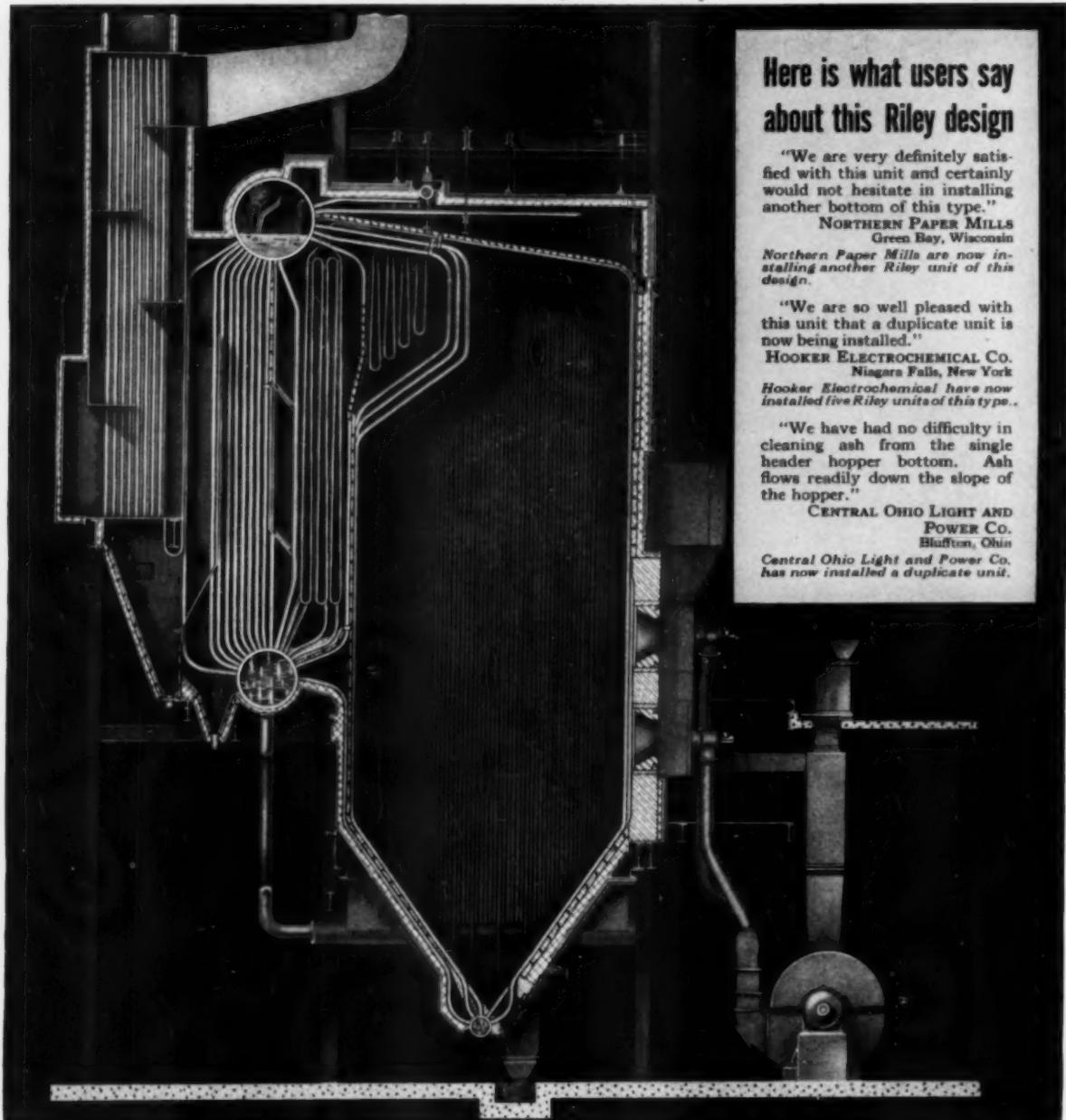
Southern Representative:

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YARWAY

blow-off valves

You save in many ways when you



Here is what users say about this Riley design

"We are very definitely satisfied with this unit and certainly would not hesitate in installing another bottom of this type."

NORTHERN PAPER MILLS
Green Bay, Wisconsin

Northern Paper Mills are now installing another Riley unit of this design.

"We are so well pleased with this unit that a duplicate unit is now being installed."

HOOKER ELECTROCHEMICAL CO.
Niagara Falls, New York
Hooker Electrochemical have now installed five Riley units of this type.

"We have had no difficulty in cleaning ash from the single header hopper bottom. Ash flows readily down the slope of the hopper."

**CENTRAL OHIO LIGHT AND
POWER CO.**
Bluffton, Ohio
Central Ohio Light and Power Co. has now installed a duplicate unit.



RILEY

STOKER CORPORATION, WORCESTER, MASS.

Boston	New York	Philadelphia	Washington	Buffalo	Pittsburgh	Cleveland	Detroit	Chicago
Cincinnati	Charlottesville	Atlanta	New Orleans	St. Louis	Kansas City	St. Paul	Tulsa	Houston
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BOILERS • PULVERIZERS • BURNERS • STOKERS • SUPERHEATERS • ECONOMIZERS

install this unique Riley Boiler Unit

designed for pulverized coal firing

YOU SAVE COST OF SEPARATE HOPPER

Since a water-cooled ash hopper is an integral part of the furnace with this Riley design, by installing it, you not only save the initial cost of a separate hopper but also the cost of hopper foundations and supports as well as future hopper maintenance.

YOU SAVE COST OF HOPPER SEALS

On units requiring a separate ash hopper, seals must be provided between the boiler unit and ash hopper to prevent air infiltration. With this Riley unit, you not only eliminate the difficulties of providing and maintaining positive seals but also the cost of them.

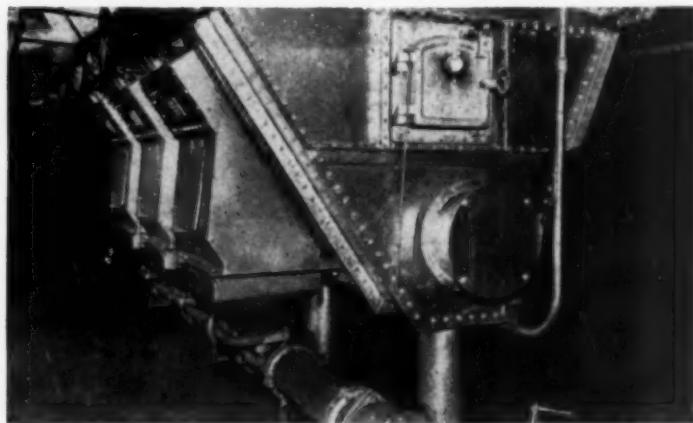
YOU SAVE IN BUILDING COSTS

For a given steam capacity and furnace width, over-all height of the unit is reduced by at least five feet resulting in large savings in building cost if new building is involved or permitting installation or larger capacity units in existing building.

SPONTANEOUS ACCEPTANCE BY ENGINEERS

Thirty-five of the country's leading consulting engineering companies have engineered boiler installations involving Riley units of this type. Engineers have selected this type of unit for over 85% of all Riley pulverized coal-fired installations, purchased since 1948.

Photo below shows Hopper Construction and Ash Conveying System.



Since the first Riley unit of this type was installed in 1946, 137 units have been sold having a steam generating capacity of over 20,000,000 lbs. per hour.

These users have expressed their satisfaction by placing repeat orders with Riley.

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Celanese Corporation of America
United States Steel Co.
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Esso Standard Oil Co.
Pratt & Whitney Aircraft Corp.
City of Holyoke
Syracuse University
Central Ohio Light & Power Co.
Western Colorado Power Co.
Riegel Textile Co.
Northern Paper Mills
City of Rochester, Minnesota
Cities Service Oil Co.
Dairyland Power Cooperative
Ohio Oil Co.

Other Users

Carbide & Carbon Chemical Co.
Western Electric Co.
Carrier Corporation
Continental Can Co.
South Carolina Electric & Gas Co.
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North American Aviation
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A survey of your Power Plant by a consulting engineer will possibly show ways of making surprisingly large savings in your power costs

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Fuel Burning Equipment

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And How to Do It

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The James Leffel & Company
Springfield, Ohio

Gentlemen: Attention: Mr. A. G. Lebold

At the present time, in our power plant, we have two Leffel Oil Fired Boilers. One is a 100 H.P. unit, the other is a 150 H.P. unit. We have the 100 H.P. Boiler as a standby unit in case of an emergency, and we are happy to say that the operation of the 150 H.P. Boiler has been so successful that we have never had to use the standby.

The 150 H.P. Leffel Boiler is operated five days a week, and at the present time is pulling as high as 270 H.P., with excellent results. Since the time of installation we have had no repairs on this outfit.

We have always considered the LEFFEL Boiler the best that is obtainable.

Yours very truly,

Chief Engineer
THE VAN DYNE CROTTY CO.

Bridges, buildings and other load-bearing structures are designed with 100% overload capacity. A boiler should be so designed, too.

All the chrome and red paint in the world won't help if you need power above your boiler's rated capacity and can't get it.

Streamlined boiler design won't keep your production up if your boiler has a tendency to break down.

A boiler rated close to its peak capacity usually has corners trimmed elsewhere. No help in an emergency. Strains to reach rated performance.

You can depend on Leffel boilers. Look at the second paragraph in the letter above. Ask about a Leffel boiler wherever you find it. You'll find it's hardly noticed, because it has done its job, and more, however old it is, with a minimum of attention.

The integrity of Leffel has never been lowered—not once—during the entire 91 years of our history.

If you want a boiler you won't worry about, fired by coal, gas or oil, drop us a line.

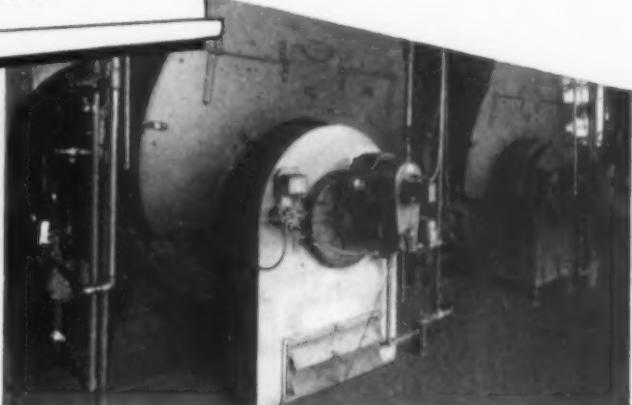


THE JAMES LEFFEL & CO.

DEPT. B, SPRINGFIELD, OHIO, U.S.A.

MORE EFFICIENT STEAM GENERATION FOR 91 YEARS

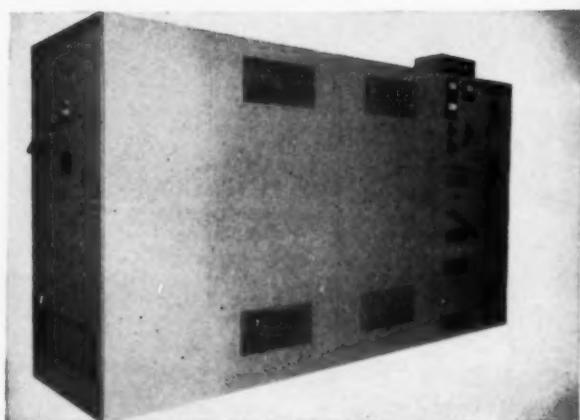
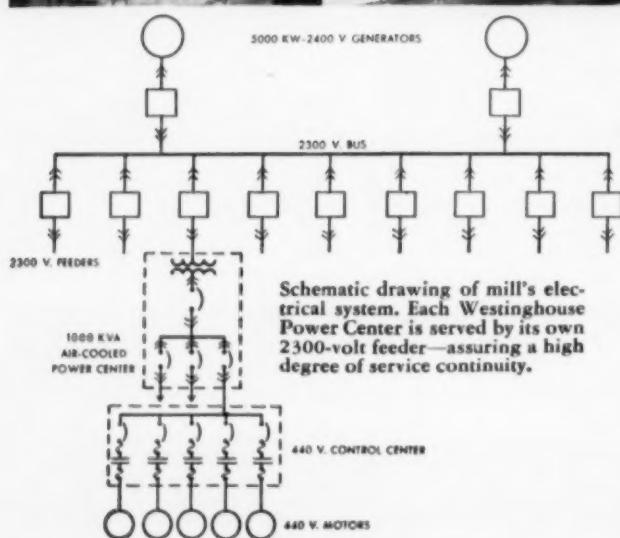
LEFFEL
BOILERS
are
Ruggedly
Beautiful—
and
you can depend
on them



The boiler room at Van Dyne-Croddy contains a 150 H.P. Leffel boiler, actually delivering up to 270 H.P., shown in the foreground—and a 100 H.P. Leffel Scotch boiler next to it.

Sheet 10-30-52

PLANNED POWER PAYS



Westinghouse 1000-kva Air-Cooled Power Center, 2300/440 volts, is factory assembled as a complete unit. Rating can be increased 25 percent by adding forced ventilation.

Get reliable, low-cost power by bringing high voltage close to loads

Men responsible for plant engineering functions will be interested in how St. Regis Paper Company provided reliable, low-cost electrical service in their new Pensacola mill. Round-the-clock production schedules had to be maintained—365 days a year. Power failures would work extreme hardship.

Called during the blueprint stage, Westinghouse helped the mill's engineers plan a modern radial distribution system. It is so designed that each power center is served by its own primary feeder. Thus, feeder and transformer faults are isolated quickly to the services of a single power center. A higher degree of service continuity is assured.

Westinghouse unitized equipment—pre-assembled and tested—helped keep power distribution costs to a minimum. Long runs of heavy, 440-volt feeders were eliminated. Feeder loss was cut. Wiring and conduit were greatly reduced.

Further, maintenance problems were simplified, since breakers and controls are easily accessible...and parts are standardized and interchangeable.

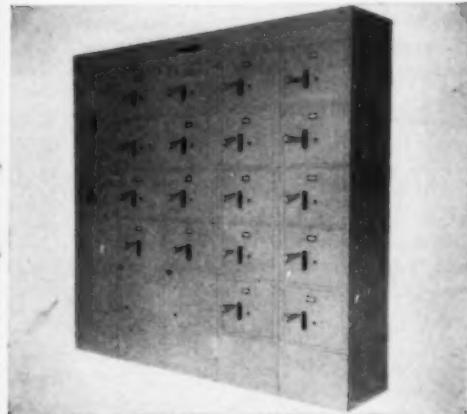
CONSIDER THIS: It takes *sound planning and co-ordinated equipment* to provide modern distribution systems, capable of meeting your plant power needs today and in the years ahead. Westinghouse offers you both...and backs them with years of experience, gained throughout all industry.

A call to your nearest Westinghouse office will bring an application engineer, well qualified to go over your distribution problems with you and your engineers. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-94956

YOU CAN BE **SURE**...IF IT'S

Westinghouse



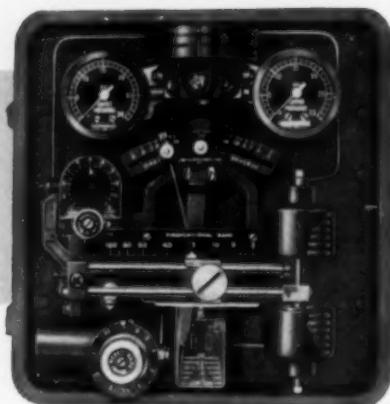
Starters are grouped in self-standing Westinghouse 440-volt Control Centers—factory assembled and wired with terminal boards. This simplifies installation and maintenance.

NEW MASONEILAN 12000 SERIES

Offer Accurate, Sensitive, New Ease of Selection;



Proportional Controller



Proportional-Reset Controller

These new controllers reflect a realistic blending of past experience and current design trends, combining advanced features which reduce weight, improve adjustability and increase ease of selection, installation and servicing.

Consider what these design improvements can mean to you . . .

UNIT CONSTRUCTION

Unit subassemblies of the control mechanisms (proportional, or proportional-reset, unit and level setting mechanism) are mounted on the mechanism bracket which is in turn rigidly attached, piloted and doweled to the torque tube housing. Thus, individual units are fixed in position, unaffected by possible distortion of the case, yet are readily removable for servicing or interchange. Other sub-assemblies (pilot and manifold) are mounted in the rugged aluminum case which is finished and gasketed for outdoor service. Cover is closed by a positive cam-type latch.

SIMPLE AIR CIRCUITS

The high-capacity, balanced, amplifying, pilot with frictionless floating-action valve and cleanable sapphire orifice, is connected to the forged brass manifold which contains most air passages. Tubing in the proportional controller is limited to two short lines. The nozzle is easily removable for cleaning, and after replacement requires no aligning. Special ring type adapters facilitate connections.

EASE OF ADJUSTMENT

Proportional band setting . . . is made on a rod-type cantilever spring by a self-aligning clamp tightened by a large knurled knob located in front of the mechanism. A four-inch direct reading scale indicates the setting.

Control action and specific gravity setting . . . are selected by attaching the control link to desired side of reversing arc along the specific gravity scale, graduated from 0.5 to 1.4. The arc is easily reversible when instrument mounting is changed to opposite side of displacer.

Set point . . . is precisely adjustable throughout entire range by turning setting knob over 270° arc scale, 2" long. Scale is reversible when control action is changed.

Direct level indication . . . is provided by a sturdy pointer fastened directly to the torque tube rod. The scale is graduated for both left and right hand instrument mounting and for several specific gravities.

FOR FEEDWATER SYSTEMS AND

LIQUID LEVEL CONTROLLERS . . .

Dependable Control – plus

Adjustment and Servicing



Top and bottom connections — integral chamber



Side and bottom (or side and side or side and top) connections — two-piece chamber (to permit field orientation of instrument)

Alignment micrometer . . . is sturdily mounted, is readily accessible and permits adjustments with minimum disturbance.

VERSATILITY

The proportional controller . . . may be used as a *Transmitter* and can be converted in the field to a

Differential gap controller . . . by simply reversing position of the coil spring and bellows in the proportional unit; or

Proportional-reset controller . . . by interchanging the proportional unit and the proportional-reset unit.

STURDY, COMPACT, ACCURATE MEASURING UNIT

All parts of the *Torque Tube Assembly* are made of a single alloy, individual parts being welded to form an integral unit. Knife-edge bearings support both ends of torque tube. Torque tube housing is removable from mechanism chamber.

Stainless . . . steel tubing *Displacers* designed so that standard control mechanism can be used for all ranges, are attached to the torque arm by hangers with modified-knife-edge hooks. Hanger extensions may be integral or detachable.

Chamber . . . assemblies are compact and light in weight to facilitate handling and installation. Mounting dimensions are uniform for all materials and ratings — and are in whole numbers; on side-mounted types mounting dimensions equal level range.

VARIETY OF TYPES, MOUNTINGS, MATERIALS

Instrument Types include *Proportional*, *Proportional-reset*, *Differential Gap Controllers* and *Transmitters*; or any combination of two of these in larger case. *Mounting Types* include top and bottom, side and side or side and either top or bottom, with screwed or flanged connections; also top or side of vessel with flanged connections. *Instrument mounting* left or right of displacer.

Ratings up to 2500 lbs. ASA.

Materials include iron (14" & 32" only), steel or alloy chambers; stainless steel displacers; inconel (or wide selection of other materials) torque tube assemblies.

Ranges — 14", 32", 48", 60", 72", 84", 96", 120"

Complete details sent on request. Address



MASON-NEILAN REGULATOR CO.

1206 ADAMS STREET, BOSTON 24, MASS., U. S. A.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa • Philadelphia • Houston
Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco • Boise • Louisville • Salt Lake City • El Paso • Albuquerque
Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham • New Orleans • Dallas • Seattle
Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

RELATED APPLICATIONS

Iron Fireman

Dual or Triple Fuel Firing

**changes fuels quickly
fires oil, gas or coal**



**Central of Georgia Railway
cuts steam costs 37%—
saves \$16,939 a year**

*J. H. Grayson, Shop Engineer,
Central of Georgia Railway Company*

"WE LIKE TO SAVE MONEY and Iron Fireman firing has shown us the way to do it," says Mr. Grayson. "The first year we installed Iron Fireman Industrial Gas Burners with Iron Fireman Pneumatic Spreader stokers as standby firing we saved nearly \$12,000 on fuel. In addition, we also saved over \$5,000 on labor costs and I can honestly say we enjoy steadier firing, improved operation, and constant steam pressure 24 hours a day."

Burns all fuels efficiently

Efficiency ratings are high with oil, gas or coal. As price advantage shifts from one fuel to another your

steam plant can shift with it—for the long pull if necessary. Or you can change fuels every day when desirable. This is routine practice in many companies where the gas supply is reduced during peak periods.

Avoid costly shut-downs

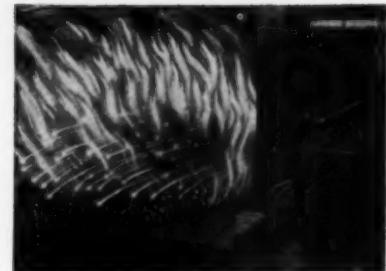
Fuel emergencies, due to interrupted or short supply, can be disastrous. Yet protection may cost little or nothing when offset by the fuel and labor savings of Iron Fireman multiple fuel firing.

For further information write
Iron Fireman Mfg. Co., 3049 West
106th Street, Cleveland 11, Ohio.

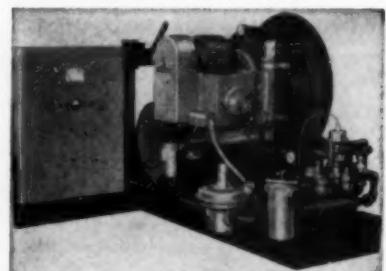
Iron Fireman



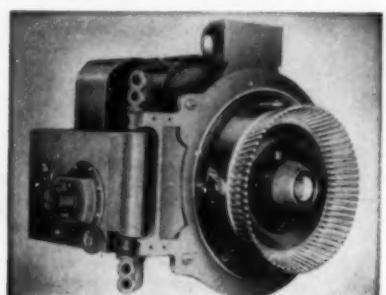
**AUTOMATIC FIRING
FOR HEATING, PROCESSING, POWER**



GAS, OIL, COAL. Equipment includes Ring Type gas burner, Rotary oil burner, and Pneumatic Spreader stoker. Coal is automatically dried, preheated and conveyed from bunker to boiler. No manual handling; no costly conveying equipment.



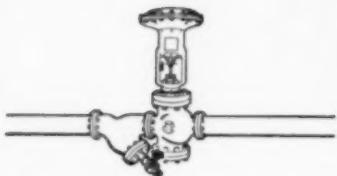
GAS-OIL PACKAGE UNIT. For Scotch marine and other types of boilers. Has integral forced draft and control panel which is completely wired and tested at factory.



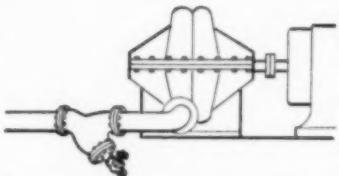
GAS-OIL BURNER. Ring Type gas burner and Rotary oil burner on single mounting. Can shift fuels quickly with no loss of efficiency.

Which of over 150^{Leslie} strainers is the one for YOUR job?

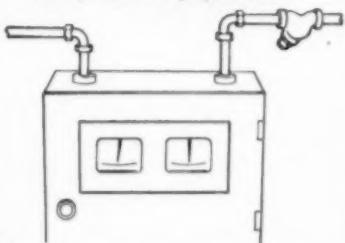
THREE "MUSTS" FOR GOOD PIPING PRACTICE . . .



1. For protection of control valves.



2. Protection of pumps, turbines and process equipment.



3. For superfine cleaning of air, steam and liquid flows, Leslie "Poromet" filters trap particles down to .001".



WHICH WILL GIVE COMPLETE PROTECTION AT LOWEST COST?

Just considering strainer body material and screen specifications alone, there are over 150 standard combinations of "Y" type Leslie strainers. Each is engineered to do specific jobs under specific conditions . . . there's a "Leslie" for any industrial or marine pipeline strainer application.*

Then, with the myriad of pipe sizes and end connections, it's apparent that picking the right strainer to protect valuable equipment exposed to flow is *not* a "pin-the-tail-on-the-donkey" task.

*There are standard units for pressures to 2500 psi; temperatures to 1050° F; semi-steel, cast bronze, cast steel and cast alloy steel; screwed, flanged, welding or ring-type ends; sizes from $\frac{1}{8}$ " to 1".

RESERVE YOUR FREE COPY OF 12 PAGE BULLETIN 5308

soon to be released, showing strainer dimensions, pressure drop charts and pressure-temperature limit tables. Reserve your copy today. Write LESLIE CO., 261 Grant Ave., Lyndhurst, N. J.

It costs no more . . .

to get the right equipment for the right job. In fact, it costs less. It will pay to call your Leslie Engineer before specifying strainers . . . or any pressure, temperature or level control equipment. He's listed in the classified telephone directory in principal cities—under "Valves" or "Regulators."

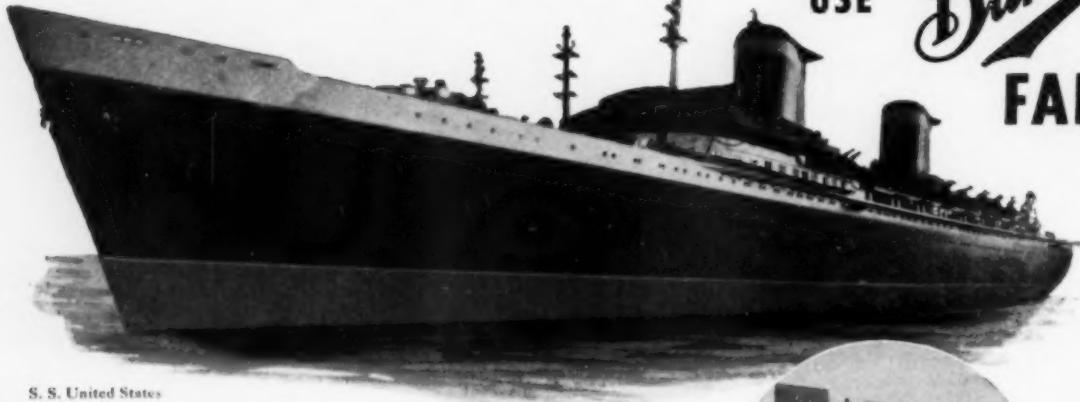
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THE FIRST NAME IN PRESSURE,
TEMPERATURE AND LEVEL CONTROLS
Since 1900

LESLIE CO., 261 Grant Avenue, Lyndhurst, New Jersey

THE WORLD'S FINEST LINER THE WORLD'S FINEST HOTELS



S. S. United States

It's nice to know that when really fine ventilating and air conditioning performance is required, "Buffalo" Fans are selected for the job.

The three new post-war hotels, which have made front page news, and the world's finest and fastest ocean liner, all depend on "Buffalo" Fans to maintain their "air of distinction."

WHY?

The "Q" Factor—The built-in Quality which provides trouble-free satisfaction and long life.



Terrace Plaza,
Cincinnati



The Shamrock, Houston



Hotel Statler,
Los Angeles

We believe you'll agree that it's more than coincidence that "Buffalo" Fans were chosen for these outstanding jobs.

We will continue to build the "Q" Factor into "Buffalo" Fans,

Air Cleaning and Conditioning Equipment, so that you may continue to specify it, with the assurance that you'll get your money's worth.

Engineering Sales Representatives
in all principal cities are anxious
to work with you.

FIRST
FOR FANS

BUFFALO FORGE COMPANY

530 BROADWAY

BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

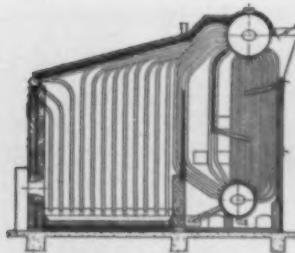
VENTILATING
FORCED DRAFT

AIR CLEANING
COOLING

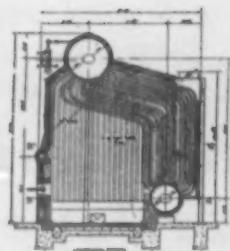
AIR TEMPERING
HEATING

INDUCED DRAFT
PRESSURE BLOWING

EXHAUSTING



2 Drum Water Tube Boiler



Type-S 2 Drum Boiler Series 51

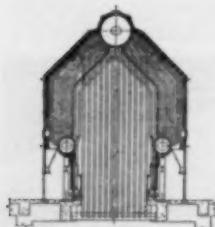
FOR ALL INDUSTRY . . .

WICKES

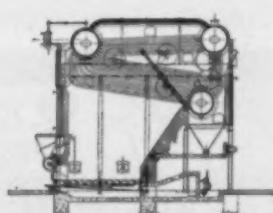
STEAM GENERATORS

• In the oil, paper and chemical industries and in manufacturing plants, institutions and public buildings throughout the world

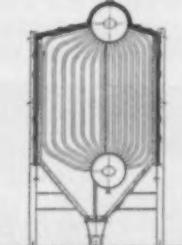
Wickes Steam Generators are in constant daily service. All types, such as those illustrated on this page, with capacities up to 250,000 lbs. steam per hour and 1000 psi. Write for descriptive literature.



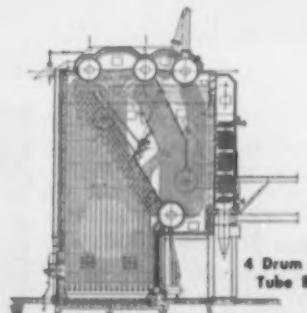
"A" Type Water Tube Boiler



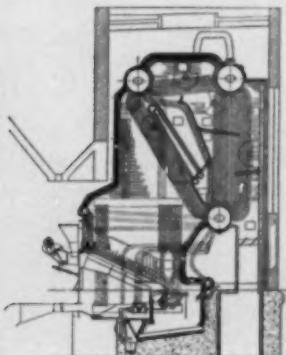
3 Drum Low Head Water Tube Boiler



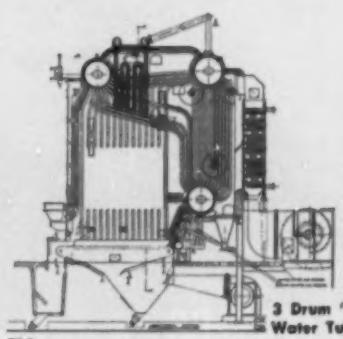
Wickes 2 Drum Waste Heat Installation



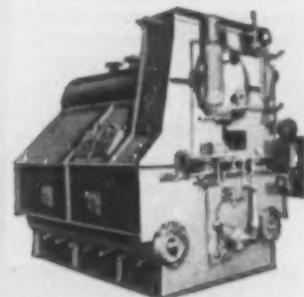
4 Drum Water Tube Boiler



3 Drum Water Tube Boiler



3 Drum "B" Type Water Tube Boiler



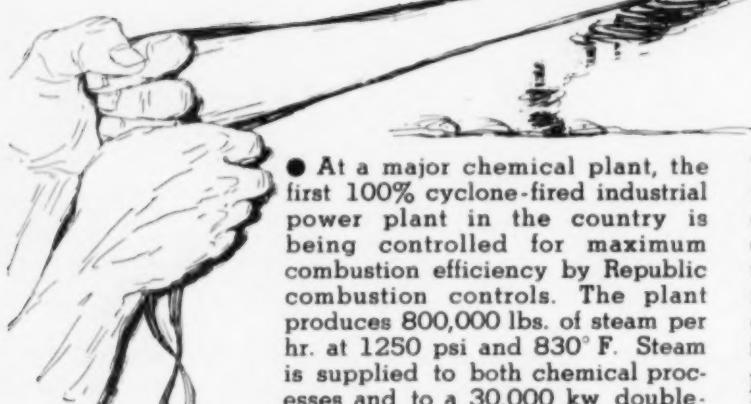
Type "A" "Packaged" Steam Generator

THE WICKES BOILER COMPANY • DIVISION OF THE WICKES CORPORATION, SAGINAW, MICHIGAN

RECOGNIZED QUALITY SINCE 1854 • SALES OFFICES: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Greensboro, N.C. • Houston • Indianapolis • Los Angeles • Memphis • Milwaukee • New York City • Pittsburgh • Portland, Ore. • Saginaw • San Francisco • Springfield, Ill. • Tampa, Fla. • Tulsa • Washington, D.C.

They're Harnessing Cyclones....

with **REPUBLIC**
Automatic
**COMBUSTION
CONTROL**



● At a major chemical plant, the first 100% cyclone-fired industrial power plant in the country is being controlled for maximum combustion efficiency by Republic combustion controls. The plant produces 800,000 lbs. of steam per hr. at 1250 psi and 830° F. Steam is supplied to both chemical processes and to a 30,000 kw double-extraction turbine generator.

This cyclone-fired plant serves as additional proof that Republic combustion control systems can be adapted for any type of fuel firing

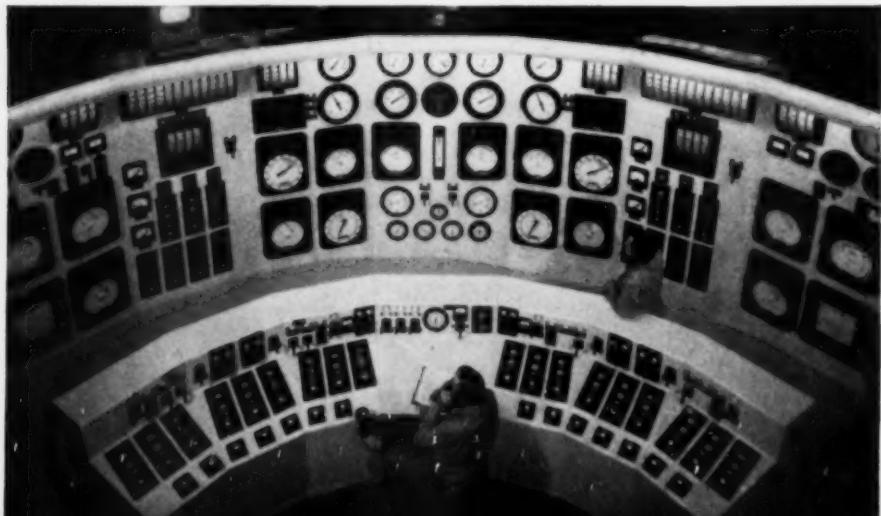
There are Republic combustion control systems for all sizes and types of boilers, all arrangements of draft equipment and for all load conditions. There's an experienced engineering staff* to help you get the combustion control system that best fits your needs.

For full information, write for Data Book S-21 or contact your nearby Republic field engineer.

**For more than 37 years, Republic has specialized in the design and manufacture of combustion control systems for all sizes of power generating stations.*

FOUR CYCLONES AT HIS FINGER-TIPS . . .

Two 400,000 lbs./hr. boilers fired by four cyclone furnaces are checked and controlled from this central control point. Republic sub-panels on the control bench board are provided for transferring between automatic and manual operation. Also included are Republic biasing sub-panels for adjusting coal-air ratio, primary-secondary air, cyclone ratio and boiler rating.



REPUBLIC FLOW METERS CO. • 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS

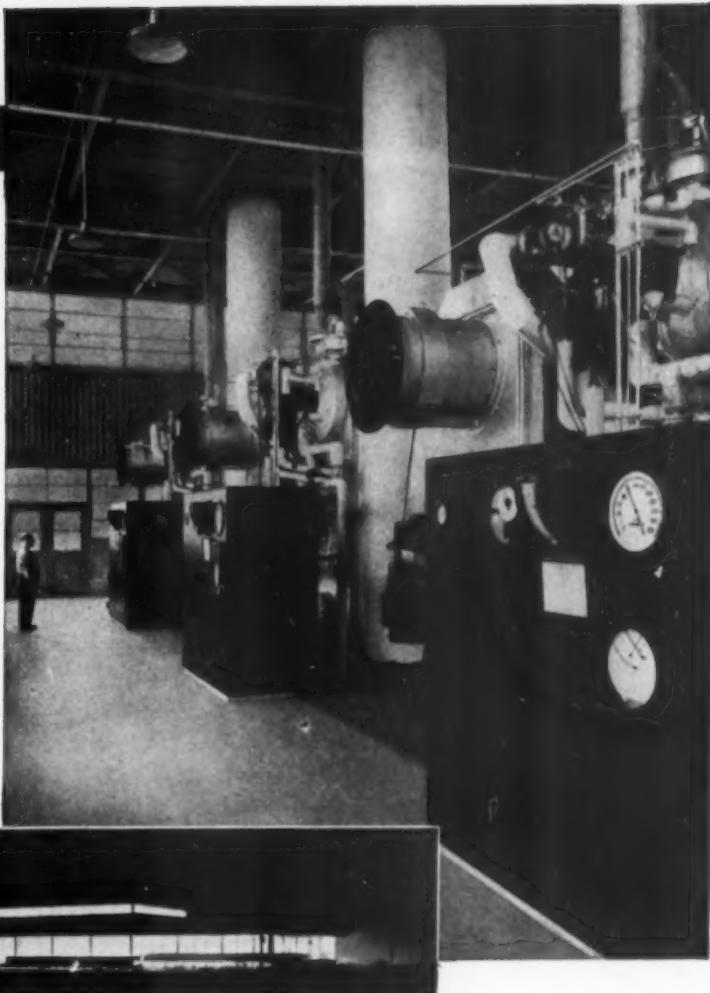
keeping steam cheap . . .

with a multiple-unit installation

at

WHITE LABORATORIES, INC.

Night view of new White Laboratories plant—
A. M. Kinney, Inc., Consulting Engineers,
Cincinnati, Ohio.



- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Suitable for Outdoor Service
- Burns Oil and/or Gas
- Saves Fuel
- Saves Space
- Safe, Automatic Operation

Installation of 3 B&W Integral-Furnace Boilers, Type FM, to serve the steam requirements of the large, modern plant of White Laboratories, Inc. at Kenilworth, N. J., is one more indication of the industry-wide acceptance trend now firmly established by these shop-assembled, B&W Units. Choice of this multiple-unit application of FM boilers instead of a single, larger unit, was decided on after careful consideration of all the factors involved in designing this new, expanded plant to provide a solution to White's continuing space problem. Each of these compact, versatile B&W Units is oil-fired by a B&W Y-Jet oil burner equipped with steam atomizer, and each is capable of producing 23,800 lb of steam per hr at pres-

sures to 235 psi.

Combining the benefits of "package" steam with cost-saving big boiler advantages, B&W's Integral-Furnace Boiler, Type FM, has already been selected for a variety of companies covering more than 50 different industries as well as utilities and other users. B&W Units having a total steam capacity of more than 6½ million lb per hr are now in service or on order. Over half of this total capacity consists of multiple-unit installations. Available in standard sizes for loads ranging between 2900 and 28,000 lb per hr at steam pressures between 15 and 235 psi, this self-contained B&W steam generator is also obtainable for operation at higher pressures.

Send for Bulletin G-76 describing and illustrating the many cost-saving features of this popular boiler. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd St., New York 17, N. Y.

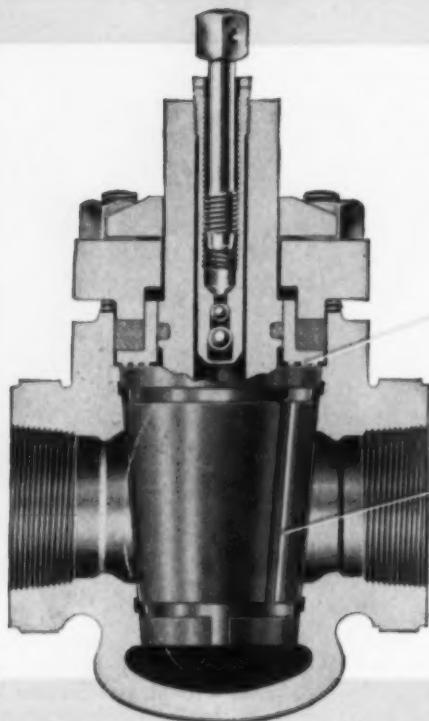


**BABCOCK
& WILCOX**

G-594

Oh, I see

OIC now offers a complete line of Lubricated Plug Valves . . .



with two added features

1 Triple seal gives more effective sealing at shank with ease of turning.

2 Lubricant grooves that are never exposed to the flowing liquid.

OIC Tapered Lubricated Plug Valves assure positive, leakproof control of flow . . .

O-Ring . . . under initial compression, gives extra protection against leakage past shank.

Resilient Packing . . . completely enclosed in nonrotating metal parts, tends to seat the plug tightly in body without excessive cover tightness.

Labyrinth Seal . . . series of concentric rings on gland collar make firm contact between collar and top of plug face, providing additional seal.

2 Vertical Lube Grooves . . . 180° apart.

When plug is given quarter turn, neither of these grooves is exposed to liquid flow.

Lubricant Chamber . . . under pressure from screw piston, lubricant creates upward force during lubrication, tending to free plug for easy turning.

Plug Lapped to Body . . . to assure perfect, leakproof fit.

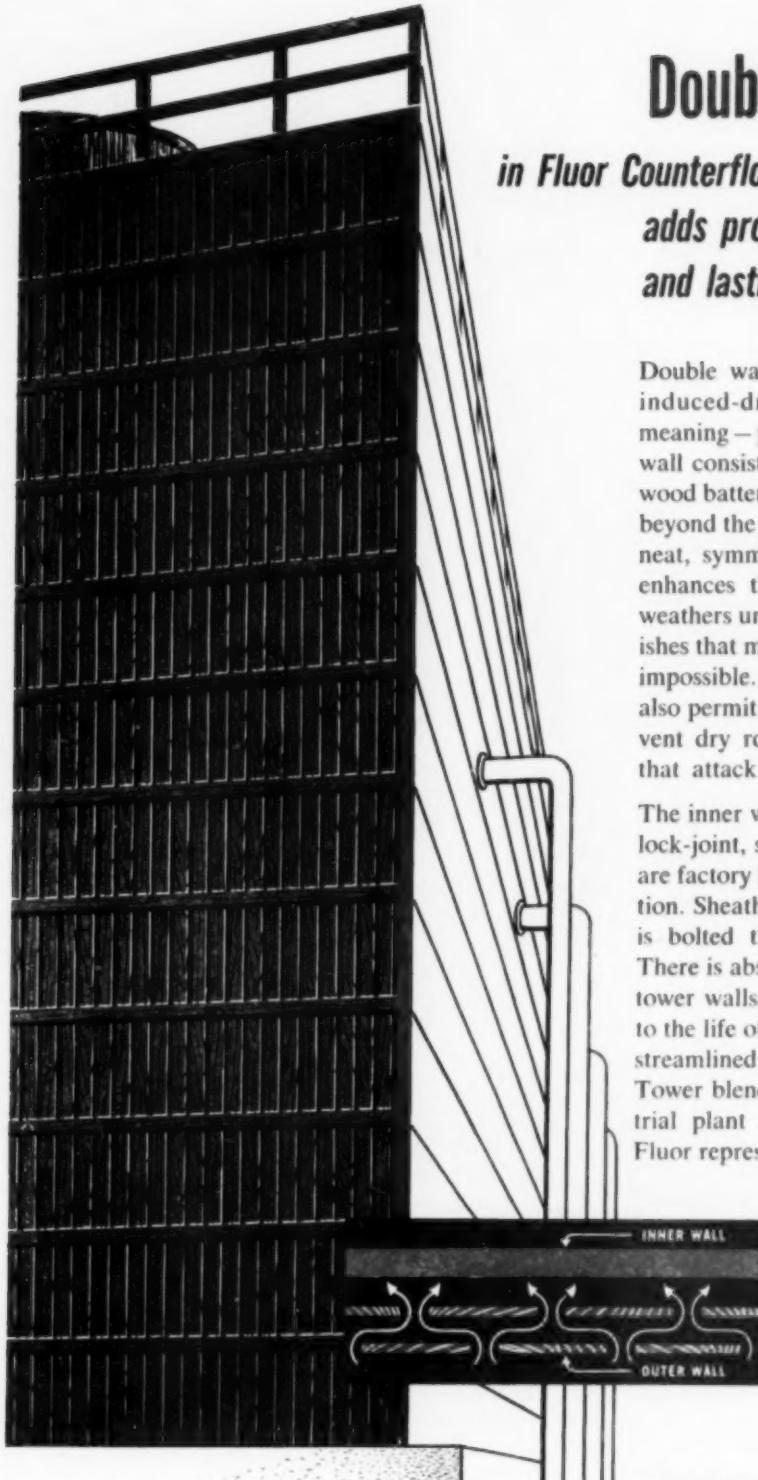
Order in semisteel or steel . . . from your local OIC Distributor. Write for literature describing the advantages of OIC Lubricated Plug Valves.



VALVES

THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

FORGED & CAST STEEL, IRON & BRONZE,
LUBRICATED PLUG VALVES



Double wall sheathing in Fluor Counterflo Cooling Towers adds protection and lasting good looks

Double wall construction provided on Fluor induced-draft cooling towers has a double meaning — protection and beauty. The outer wall consists of a double row of vertical Redwood battens which are located four inches out beyond the inner wall. This protective casing is neat, symmetrical, eye appealing and greatly enhances the beauty of a cooling tower. It weathers uniformly. Unsightly stains and blemishes that mar a cooling tower's appearance are impossible. The equally spaced rows of battens also permit air circulation around walls to prevent dry rot, algae growth and other blights that attack unventilated cooling tower walls.

The inner wall is constructed from 1 x 6 full Z lock-joint, select "heart" Redwood. Both walls are factory fabricated into panels for easy erection. Sheathing is not nailed to outer posts but is bolted through the main tower columns. There is absolutely no structural load borne by tower walls, another factor which adds length to the life of a Fluor Cooling Tower. The neat, streamlined appearance of a Fluor Cooling Tower blends well with today's modern industrial plant equipment. Contact your nearest Fluor representative, or write for details.

◀ Top view of double wall. The uniform spacing of vertical battens is not for the sake of appearance alone. Air is permitted to circulate between the aerators to prevent dry rot and living organisms from attacking tower walls.

BE SURE WITH

FLUOR



THE FLUOR CORPORATION, LTD.
LOS ANGELES 22, CALIFORNIA

FOREIGN FACTORIES-FLUOR-PARIS
FLUOR OF CANADA-TORONTO
FLUOR INTERNATIONAL-BEIRUT
REED WRIGHTSON-LONDON

ENGINEERS
CONSTRUCTORS
MANUFACTURERS

NEW YORK
CHICAGO
BOSTON
PITTSBURGH
SAN FRANCISCO
HOUSTON
BIRMINGHAM
TULSA

NOW . . .



1. THE LINE-UP . . . After precision positioning of butts the joint is tack welded to hold in place during the welding of the initial bead by the K-Weld process. This new technique entails the use of an inert gas under controlled pressure on the inside of the piping.



2. INITIAL BEAD IN K-WELD . . . Only the initial bead is laid by the K-Weld process. It eliminates the need for a backing ring, permits the complete penetration required for critical high-pressure, high-temperature power piping being installed today.



3. FIRST INSPECTION . . . Either Zy glo or X-ray can be used to inspect the K-Weld bead. Elimination of the backing ring removes the stress raising condition at the weld root which can produce flaws either as a result of thermal effects of subsequent weld layers or later severe operating conditions.



Done with mirrors . . . A conventional telescopic bore-sight plus a mirror positioned at the weld permits visual inspection of the K-Weld root. Note smoothness and absence of any icicles which might create local turbulence or break off and damage equipment.

.K-WELD

a picture story of the new welding technique that...

- assures complete penetration without backing rings

From rockets to power piping is largely the story of Kellogg's new K-Weld process, a welding technique that assures a sound root weld in the fabrication of piping. It stems from Kellogg's initial work in the production of thin-wall rockets where shielded-

- applies to all power piping materials
- for use in shop and field fabrication

arc welding is a requirement in fabricating stainless steel rocket tubes. How this technique has been developed and extended to the fabrication of critical high-temperature, high-pressure piping is detailed in the accompanying picture story.



4. COMPLETING THE WELD . . .
Conventional shielded metallic arc welding is employed to complete the weld which can be done by any competent welder qualified for this class of work.



5. STRESS RELIEVING . . . The completed weld after grinding is ready for heat treatment in the customary manner. An additional advantage of K-Weld is that elimination of the backing ring materially aids in the interpretation of radiographs.



6. A PERFECT WELD . . . Final inspection is made of the weld. Here K-Weld has been proved to be extremely useful in eliminating the root cracking associated with austenitic welding . . . providing a completely satisfactory weld.

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- Hydro-Electric Power Commission
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- Interbrahant (Belgium)
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OTHER FABRICATED PRODUCTS including: Pressure Vessels . . . Vacuum
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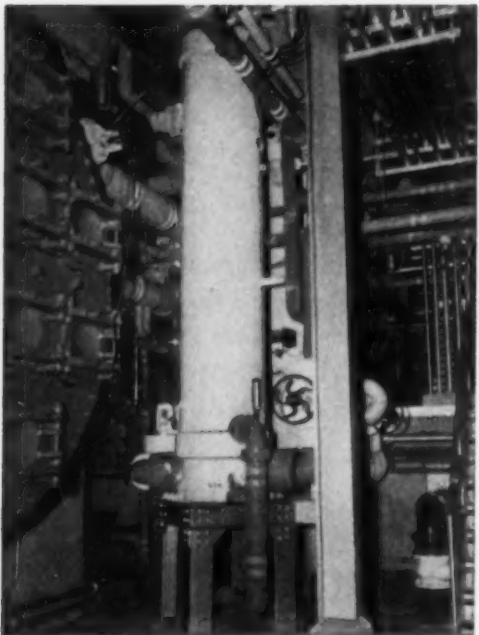
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Intermediate and High Pressure Feed Water Heater for Unit No. 1. Both heaters operate with 1200 psig in water passages and have integral de-superheating and drain cooling sections.



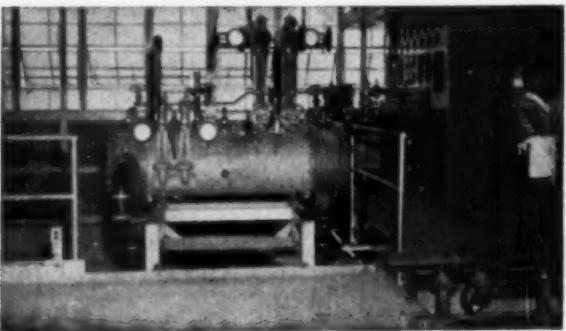
CONSECO Condenser installed ready for final painting and Feed Water Heaters ready for application of insulation. Unit No. 3.

WHEN the new San Juan Steam Plant is completed, CONSECO will have furnished the following equipment:

- 2 20,000 sq. ft. CONSECO two-pass divided flow Condensers for Units Nos. 3 and 4.
- 2 twin element two-stage CONSECO Steam Jet Air Ejectors for Units Nos. 3 and 4.
- 4 834 sq. ft. CONSECO high pressure Heaters. Forged steel heads are of the shear ring design with integral tube sheets. For Units 1, 2, 3 and 4.
- 4 834 sq. ft. CONSECO intermediate pressure Heaters. Forged steel heads are of the shear ring design with integral tube sheets. For Units 1, 2, 3 and 4.
- 2 single stage non-condensing hogging Ejectors for Units Nos. 3 and 4.

As of this time, Units Nos. 1 and 2 are in operation. Unit No. 3 will be on the line soon. Unit No. 4 presently being fabricated.

Selections of CONSECO equipment for this new power plant is evidence of recognition of CONSECO'S competent engineering as well as responsibility for meeting performance guarantees. Every day dependable service of CONSECO equipment in hundreds of plants is a matter of record. Send for illustrated Engineering bulletins covering CONSECO Condensers, Feed Water Heaters, Evaporators, Deaerators, Boilers, Steam Jet Air Ejectors and Refiner Filters.



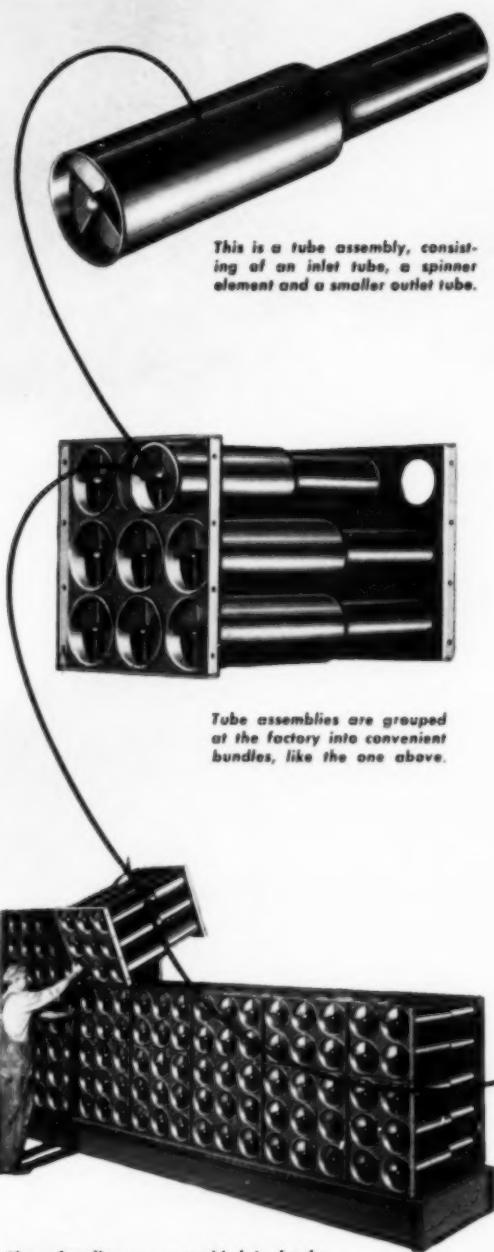
One of the two Twin Element CONSECO Air Ejectors in this new Puerto Rican power station serving a 20,000 sq. ft. CONSECO Condenser. Each unit is complete with pressure reducing valve, socket-welded steam piping and CONSECO thru-type Air Meter. It is one of the largest power plant type ejectors to be equipped with combined inter and after condensers. Air Ejector shown serves Unit No. 3.



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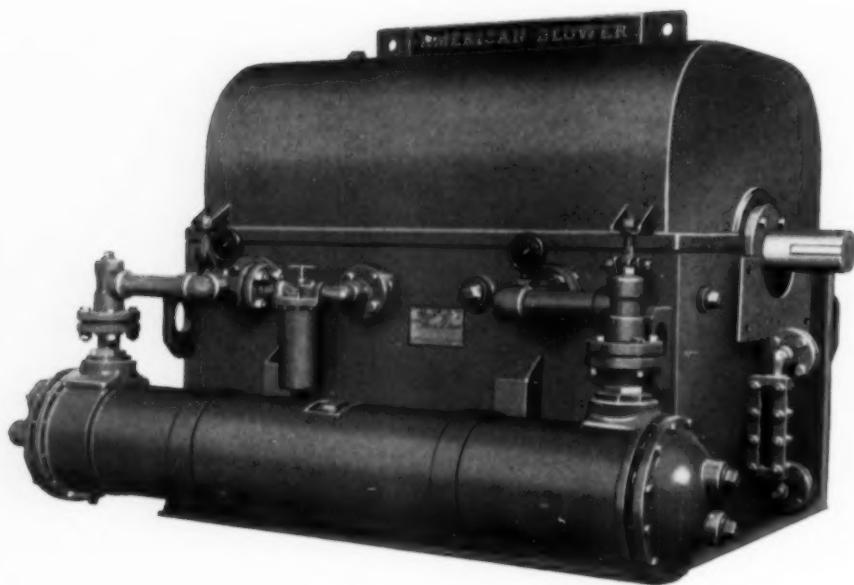
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SOUTHERN POWER & INDUSTRY for JULY, 1953

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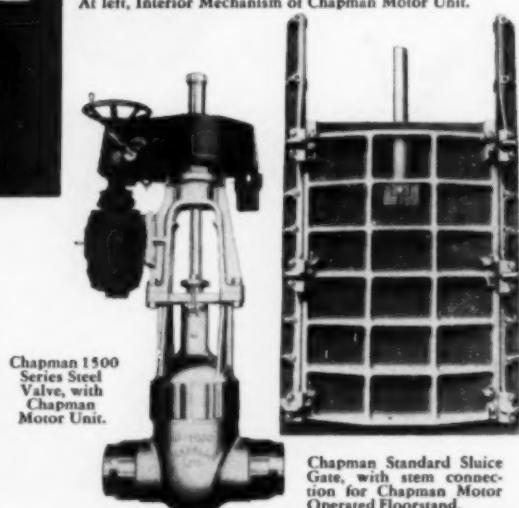
For positive control of large valves and sluice gates, the Chapman Motor Unit can safely be given your "power of attorney." The floorstands with Chapman Motor Units come to you with all wiring complete, so that all you have to do is bring the power leads into the connection box... which speeds up installation, insures proper operation, and saves wiring costs.

The Chapman Motor Unit is completely housed and thoroughly weatherproof. And the unit itself has the ruggedness of simplicity, with a slow-speed motor driving direct through two trains of spur gears. So there's no drift. The limit switch can be adjusted so the gate or valve closes to the exact seating position. Hand-operated, too, if the need arises. See what this modern electrically driven Motor Unit can do—and save—for you. Write for Catalog No. 50.

The CHAPMAN VALVE Mfg. Company
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Above, Floorstand equipped with Chapman Motor Unit, Control Panel, Motor, Limit Switch and Push Button Station all completely wired. At left, Interior Mechanism of Chapman Motor Unit.



Chapman 1500
Series Steel
Valve, with
Chapman
Motor Unit.

Chapman Standard Sluice
Gate, with stem connec-
tion for Chapman Motor
Operated Floorstand.

Timely Comments



New Ideas in Turbine, Boiler, and Plant Design

Steam Pressure—4,500 psi

Steam Temperature—1,150 F

A MAJOR FORWARD STEP in development of the technology of economical generation of steam-electric power is indicated by announcement of plans for a new boiler and turbo-generating unit designed to cross the barrier of "super-critical pressure" for the first time in the commercial production of electric power.

It will be the most efficient generating unit ever built and will utilize the unprecedented steam pressure and temperature of 4,500 psi and 1,150 F.

Announcement of plans to build the unit was made by Philo Sporn, president of American Gas and Electric Company; Alfred Idles, president of The Babcock & Wilcox Company, and Glenn B. Warren, vice president of General Electric Company and general manager of its turbine division.

General Electric will design and manufacture the 120,000 kw turbine and Babcock & Wilcox will design and build the boiler. The turbine, at 4,500 psi, will operate at almost double the present highest steam pressure utilized for power generation. The initial steam temperature of 1,150 F will be 50 degrees above the present highest and will be followed by two stages of re-heat, the first at 1,050 and the second at 1,000 F. The boiler will be the "once-through" type, in which water pumped at 5500 psi is changed into superheated steam in a single fast passage through the tubes in the boiler. It will be equipped with cyclone furnaces to insure rapid and complete burning of the coal and prevent air pollution.

The entire project, cost of which will exceed \$12-million, is being engineered by American Gas and Electric Service Corporation, a subsidiary of American Gas and Electric Company. The new unit will be installed under Service Corporation supervision at The Ohio Power Company's Philo Plant near Zanesville, Ohio. Ohio Power is an AGE operating company subsidiary.

"Many new ideas in turbine, boiler and plant design will be incorporated and tested in this development," Mr. Sporn stated. Among these are the use of: (1) steam pressure above the supercritical pressure of 3,206 psi (2) initial steam temperature of 1,150 F, and (3) more than one stage of re-heat.

"While the use of boilers above the super-critical pressure of 3,206 lb had been considered before and while laboratory pressures above that value had been utilized, no practical design had ever been developed." He explained that, above the super-critical

pressure range, water passes immediately into steam, without any intermediate stage of "bubbling," such as is observed in a pot of boiling water at atmospheric pressure or exists in a boiler operating at any pressure below 3,206. The use of this very high boiler pressure means that no boiler drum (normally the biggest and heaviest single item of equipment in a power plant and used to separate the bubbles of steam from the water) will be required. Re-circulating pumps will also be eliminated.

"It is this that in part makes the 'once-through' idea so attractive," Mr. Sporn said. "The boiler becomes, in effect, a continuous run of tube into which water is pumped at one end and out of which highly superheated steam is delivered at the other end." In such a boiler, the feedwater is not delivered to a central drum. Instead, it passes directly from a newly-designed feed pump to the boiler unit where it is heated and converted to superheated steam at 1,150 F, passing through the boiler and superheater just once.

The principle of "re-heat" of steam is used in the most modern power plants to utilize practically every ounce of energy contained in it. In the new Philo generating unit, the "double re-heat" method will realize even greater efficiencies. It involves leading the steam back into the boiler setting twice for re-heating during its passage through the turbine.

"The use of higher pressures, higher temperatures and new ideas in re-heat at Philo," Mr. Sporn declared, will make possible not only new standards of efficiency in generation of steam-electric power, but ultimately will make possible capital reductions by decreasing size of units and bringing about more effective utilization of materials. In this work, background experience of the last 30 years will be supplemented by the most advanced power plant conceptions, and integrated by three organizations—AGE, G-E and B. & W.

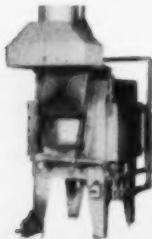
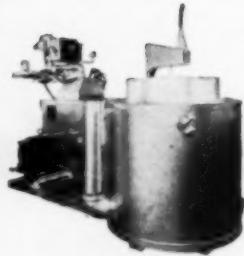
"Even more important is the fact that the successful development of power generation at this new plateau of higher pressures and temperatures will make possible in time still higher pressures and temperatures and additional re-heats and resulting efficiencies hardly visualized a few years ago. Efficiencies of conversion of the heat in fuel into electric energy of the order of 50 per cent are distinct possibilities. Certainly they loom on the horizon."

The new 120,000 kw unit will be a developmental model. And to cross the barrier of critical pressures, new concepts of turbine design will be required for this machine. It will replace and use the same building now occupied by a 40,000 kw unit built in 1923.

Conveyor
brazing
furnace



Batch
tempering
furnace



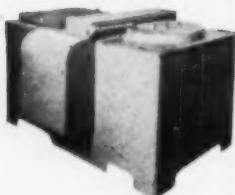
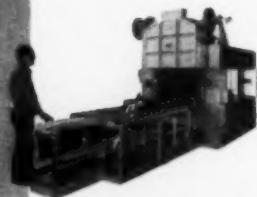
Controlled
atmosphere
hardening
furnace
(tool room)



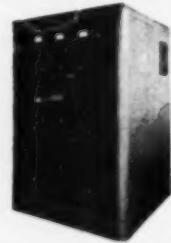
Controlled
atmosphere
conveyor
furnace
(production)

a complete line of
heating and melting
FURNACES

Production
annealing
and stress
relieving
furnace

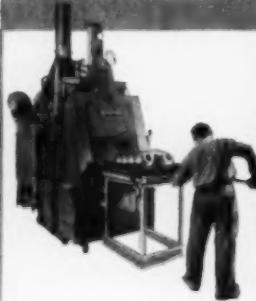


Lindberg-Fisher
2-chamber
induction
melting
and holding
furnace

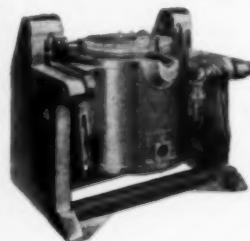


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Industry Speaks

SOUTHERN POWER
AND INDUSTRY

A NEW SCENE FROM AN OLD PLAY

HOUSTON—still in its adolescence among the world's industrial giants—is the stage on which is played each day a new scene from an old play called the industrial revolution.

The big industrial surge which began in 1939 found Houston the focal point of an unprecedented program of development and expansion in an area known as the Golden Bend of Texas. Stretching from Sabine Pass to the mouth of the Rio Grande, the area was a "natural."

Given the impetus of World War II, industry found in the Houston area not only the rich natural resources—petroleum, natural gas, sulphur, lime and salt—which they expected, but an energetic labor force, a complete network of highway, rail and water transportation, an adequate water supply and an overall physical and economic condition favorable to continued industrial development.

Instead of the leveling off period which was predicted for Houston after World War II, the post war years saw new manufacturing plants being added to the industrial skyline at an even more accelerated rate.

Manufacturing establishments in metropolitan Houston reached 1,332 by the beginning of 1953, with the value added by manufacture approaching three-quarter billion dollars. Total industrial production is set at some two and a half billion dollars. Some 85,465 industrial workers come in for a share of Houston's \$300,000,000 industrial payroll. Harris County's total labor force is 376,475.

Today, capital investments in plants lining the Houston Ship Channel exceed a billion dollars. The busy Port of Houston is consistently ranked as the nation's number two deep seaport, tonnagewise, second only to New York City. The young port handled more than 45 million tons of cargo in 1952. Industrial development has also caused Houston to be ranked 14th in the United States in population, and conferred on it the title of largest city in the South, with a 1953 population of 665,000 within the 163 square mile incorporated area and 924,000 in Harris County.

The most recent trend in additions to Houston's industrial family is a steady stream of end product manufacturers and fabricators. This has been prompted by, first of all, a desire to locate near the raw material processing plants, and secondly, because Houston's growing market area presents an attractive combination of population and buying power.

Metalworking Boom

Houston's metals goods industry, which has been on a steady upgrade during the past decade, was boosted in 1952 by the opening of new plants and the expansion of others. The Tenn-Tex Alloy and Chemical Company

opened a plant which is producing 2,500 tons per month of ferromanganese and ferrosilicon, used by the nearby Sheffield Steel Corporation plant in the manufacture of steel. A Chamber of Commerce survey conducted during the latter part of the year showed a \$310,461,000 investment in metals plants in the Houston area, with planned expansion by 1954 amounting to \$5,326,000. The metals industry employs 34,864 workers, with a monthly payroll of \$11,590,000.

Huge Power Expansion

Houston Lighting and Power Company spent \$23,745,000 in 1952 to install new equipment needed to supply an ever increasing demand for electric power. The firm also announced it would spend another \$27,000,000 for extending its services in 1953. By 1954 Houston Lighting and Power Company will have in operation five of the largest generating plants in the Southwest with an output of 1,350,000 hp, more than double their pre-Korean War capacity.

Non-residential consumption of electric power in metropolitan Houston during 1952 amounted to 2,202,401 million kwh, compared to 1,824,402 for 1951. Non-residential consumption of natural gas rose to 191,163,071 million cu ft in 1952.

Chemicals—The Big Boom

The classification of industry showing by far the greatest expansion in the Gulf Coast during the past decade is chemicals. An official of Monsanto Chemical Company summed up the industry as follows: "About 85 per cent of the nation's petro-chemical plants are located in the crescent shaped area from Baton Rouge, Louisiana, to the southern tip of Texas. There are more than 40 plants employing 30,000 workers with an annual payroll of \$120,000,000. Another 14 plants are already under construction.

"Some 90 per cent of the nation's styrene monomer and butadiene used in the manufacture of synthetic rubber is produced in the area, and the production of soapless detergents has increased more than 73 times since 1937. Production of detergents in 1953 is estimated at 1.6 billion pounds."

Defense Production Administration certificates of necessity granted in 1952 in the Texas Gulf Coast area to refineries and chemical plants total \$485,721,000—\$83,963,000 of which are within the immediate Houston area.

Some twenty chemical plants in the immediate Houston area report a total capital investment of \$250,000,000 and expansion by 1954 amounting to another \$90,000,000.

In the socialistic attacks on the electric power industry we find that

It CAN Happen Here—



By **FRANK M. WILKES**

President, Southwestern Gas & Electric Co.

SOON after the turn of the century, a small group of English pseudo-intellectuals, infected with the doctrines of Karl Marx, formed what was known as the Fabian Society. Their purpose was to destroy England's long-time free enterprise system, and to replace it with socialism and its running mate, communism.

The society was named after a famous Roman general, Quintus Fabius, who was able to defeat the invading hordes of the Carthaginians under their great general, Hannibal, without actually meeting them in open battle, but with a policy of attacking behind their lines, cutting off their supplies and weakening them at their base.

Following a similar undercover policy of boring-from-within, the Fabian Society in the last fifty years has been undermining the great British empire, which once boasted that the sun never set on its possessions.

Soon after the forming of the Fabian Society, similar organizations were started in this country. They adopted the same kind of tactics, designed for the overthrow of our American way of life.

You may say, "It can't happen here!" But the answer is that it is happening here, and already the Fabian tactics have succeeded in undermining a considerable portion of our free enterprise system.

To realize what goes on here, one must first understand that communism and socialism are alike in their basic concept that government ownership should supplant our profit system.

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Actually, government in any business is socialism; and unless the American people wake up to this simple fact, the things that made America great over the last two hundred years will be lost in the lifetime of those now of age in this country.

The initial target for the boring-from-within tactics of the socialists and the "pinks" of this country has been the electric utility industry. Despite its outstanding performance—despite the fact that it is the only major industry furnishing a better product than was available ten, fifteen and twenty years ago and selling it for less money—the electric utility industry has become the primary object of our Fabians in a long-range campaign to do away with the private ownership of all business and industry in this country.

Government Enters the Utility Field

We might say it started as an aftermath of World War I, in the disposal of one of the Federal Government's belated war-time developments, its Muscle Shoals nitrate plant on the Tennessee River in Alabama, together with a dam and a steam electric generating plant.

Many fair offers for purchase of the property were rejected, and several bills providing for government ownership and operation were killed by Congress. But soon after the coming of the New Deal, in 1933, a new bill was introduced in Washington authorizing the completion of Muscle Shoals and providing for "flood control, navigation and for other purposes" on the Tennessee River.

From this bill, which did not claim "public power" as its principal purpose, has grown the Tennessee Valley Authority, which now dominates the economic

And it HAS!

**No. 8 of a series on problems
of business and government**

life of the area several times as large as that contemplated in the original bill. It is now purely a power project, providing little or no flood control, or navigation. By the middle of 1956, it will be producing more than two-thirds of its total output of energy by steam power. It has completely destroyed every private electric utility in the area served by it, and is now spreading into the Cumberland Valley over the protests of the citizens of that valley, and is endeavoring to take over more and more of the property belonging to private companies in neighboring areas.

Immediately following the passage of the Tennessee Valley Authority Act, in May 1933, Congressman John Rankin of Mississippi introduced a bill providing for nine TVAs, which would cover the entire United States, and which if it had been passed would have quickly and efficiently completed the socialization of the electric industry in this country. Congress, however, was beginning to wake up to the fact that the TVA had little or no intention of fulfilling its constitutional purposes, but was aimed directly at socialization of this country. The Rankin bill died in the committee.

In the years that followed, the Missouri Valley Authority, the Columbia Valley Authority, the Arkansas Valley Authority, and other authority bills have all met the same fate. However, efforts of socialization to destroy the industry did not stop with this rebuff. Through various relief agencies, such as the Public Works Agency, Works Progress Administration, Federal Works Agency, and other alphabetical agencies, the government proposed and in many instances made loans and grants to the states for the development of several rivers as "make-work" plans to help alleviate the depression. Several of the states took advantage of



MR. WILKES has been connected with the electrical industry continuously since his graduation from the University of Kentucky in 1908, with the exception of a period of military service during World War I. In 1919, he became commercial manager of the Arkansas Power & Light Co., and ten years later he was vice-president and general manager. As president of the Southwestern Gas & Electric Co. for the last ten years, he has been one of the recognized leading spokesmen for the electric power industry in its efforts to ward off the socialization of this great industry.

this offer, among them Nebraska, where the Nebraska Power Authority has now taken over all of the private electric industry in that state; and the Lower Colorado River Authority, with headquarters in Austin, Texas, where all electric utilities in nineteen counties have been taken over by the state authority. Also, this is true in the Pacific Northwest, with the development of Bonneville Power Administration, and various multiple purpose projects of the Bureau of Reclamation.

Perversion of the REA

In 1936 Congress passed what I consider one of the most constructive pieces of legislation ever placed on our statute books. This was the Rural Electrification Act of 1936. It represented a real desire on the part of Congress to assist rural areas in obtaining electric service. Its passage was not opposed by any of the electric utilities. It was very carefully drawn in the effort to eliminate any chance of perversion by the borers-from-within. And during the first three years of the REA, great strides were made not only in rural electrification but, also, in cooperation between the electric utility industry and the rural electric cooperatives.

For some reason it took the American Fabians three years to realize what a potentially effective tool was at

It CAN Happen Here—And It HAS!

(Continued from preceding page)

hand in the rural electrification movement. But when they did wake up, they were not long in acting. Suddenly on June 30, 1939, by presidential edict, the Rural Electrification Administration as such ceased to be a separate agency of the government. It was transferred to the Department of Agriculture and was placed in charge of men taken from other bureaus. From that time on REA was just another satellite operation for the socialization of this country, covering up its activities in this respect by legitimate and worthless loans to rural electric cooperatives formed under the various state laws.

It was about the time REA commenced to invade the territories and activities of private electric utilities that we of the industry began to realize that there was a master plan somewhere for all these operations. After diligent search we found the blue print, and we have it in our possession today in the form of the original and photostatic copies of an article in the March 5, 1927 issue of *The New Leader* entitled "How Shall the Socialists Attack the Problem of Winning the Ultimate Abolition of the Profit System?"

The author of that article recommends to his fellow socialists that they introduce young men into government bureaus where "one good man with his eyes, ears and wits about him, inside the department . . . can do more to perfect the technique of control over industry than a hundred men outside." He goes on to summarize the various methods which had been used in the effort to gain control of the electric utility industry—recommending as most effective the setting up of power authorities such as Muscle Shoals, Boulder Dam, and on the St. Lawrence. The article closed by stating:

"Our long-time aim is the abolition of the profit system for private use, our strategy is to make and take every opportunity to prove that it works. We must force our experts on agriculture, trusts, coal, power, subways, housing, milk, etc., to tell us correctly what the next steps are, and then take them and identify ourselves with their success."

Having discovered a copy of this blue print, we immediately went in search of the author. We found him following out his own blue print exactly. His location was in the department of the Interior. He was, in fact, head of the Power Planning Division of that Bureau.

The electric utility industry suddenly and violently woke up to the situation. We already had two strikes on us from the activities of the socialists of this country. Our natural allies, the rural electric cooperatives, had been taken over and were being exploited by the federal bureaus in Washington. Super cooperatives had been formed in 1941 to build heavy transmission lines and generating plants to serve not only electric cooperatives but every power industry. Despite war-time copper limitation orders, the REA went blithely on, duplicating our existing lines and wasting tons of the scarce metal.

Finally, the activities of the REA became the subject of a congressional investigation, as a result of which many of its top men were fired and there was

a complete reorganization of this agency. Claude R. Wickard was induced to step down from the position of Secretary of Agriculture to take charge as Administrator of REA. His good name was necessary to remove the stigma left by the preceding administration.

Perversion of Flood Control

In 1944, what was known as the Omnibus Flood Control Bill of 1944 was enacted into law by Congress, providing for a sales agent for the power and energy incidentally produced at multiple purpose projects constructed by federal funds. The bill named the Secretary of the Interior as such sales agent. Obviously, this was most disturbing to the utility companies and a representative was selected to appear before the Senate Committee (the author of this article was so selected) to urge the need of suitable protection for both the private electric companies and the public.

The committee was definitely convinced of the necessity for such protection and, in reporting the bill out with a suitable amendment, made this statement:

"The committee desires an amendment which provides a convenient and practical method of disposing of power at projects under the control of the War Department without setting up a public power trust which would be unduly competitive with established private power companies."

As the bill was amended, the utility companies were well satisfied, since it apparently gave protection against willful construction of transmission lines by the Department of the Interior; against its using money derived from the sale of power and energy for any purpose except to retire the power portion of the investment in multiple purpose projects; and against expenditure of new funds without specific appropriation by and approval of the Congress. Further, the Act was clearly so worded as to protect the industry against the acquisition by the Department of the Interior of any additional power and energy, whether produced by steam or otherwise. At least, we thought it did.

Imagine the surprise of the companies in the Southwest when in 1946 the Southwestern Power Administration submitted a so-called "Comprehensive Plan" which requested appropriation of \$223,000,000 for the construction of some 18,000 miles of high tension transmission lines, duplicating wholly or in part the high voltage lines of the private companies in the six-state Southwest Area—and, still worse, asking for the construction of 850,000 kilowatts of steam generating capacity located at various points in the Southwest Area.

Of course, the private companies immediately pointed out to the committees of Congress that this was not the intent of the Flood Control Act of 1944. Congress was sympathetic to our position and denied any money for steam plants—though a small appropriation was made to tie Norfolk Dam, on the Norfolk River in northern Arkansas, to Denison Dam on the Red River.

In subsequent years the Department of the Interior (Southwestern Power Administration) again and again made application to the Congress for funds to

build transmission lines in the Southwest, but no funds were forthcoming.

However, it became evident in time that the Blueprint Maker had worked out a new plan to circumvent the will of Congress. The Rural Electrification Act of 1936 set up a blank check to the credit of the Administrator for the purpose of making loans for rural electrification purposes to bring "electric service to persons in rural areas not receiving central station service." No further action by Congress was required to make this money available for construction of generating stations, transmission lines, etc. And of the total appropriations under the Act up to 1951, more than a billion dollars remained on the shelf, subject to the whims of the Administrator of the REA.

Under the Flood Control Act of 1944, the Department of the Interior had been forbidden any sums for construction of generating plants and had been denied the right to construct transmission lines at any points where there were existing utilities. But under a new "continuing fund" authorization (set up for "use in emergencies and to provide for continuity of service and to provide for payments for rental to transmission lines and purchase of electric service") the Department of the Interior (SPA) and the Department of Agriculture (REA) got together and not only planned but *contracted for* three generating plants in Missouri, one in Oklahoma and one in Arkansas, whereby super cooperatives or G&T cooperatives were formed with three or more distribution cooperatives as members. Similar plants for the entire country were placed in the planning stage.

These super cooperatives would borrow money, ranging from \$10,000,000 to \$20,000,000 each, for the purpose of constructing a steam generating plant and several thousand miles of high tension transmission lines. It was provided that Interior (SPA) would purchase the power under a 40-year contract; and at the end of the contract SPA would own the transmission lines by payment of \$10.

Space does not permit giving all the frightening details of the plan. Suffice to say that, once the operation had been started, it would not be necessary for the Department of the Interior to ever come back to Congress for an appropriation, and generating plants and transmission lines could be constructed all over the United States by the REA and the output of the plants and, ultimately, the transmission lines, sold to the Department of Interior. Had this scheme prevailed, it could easily have resulted in the destruction of the entire electric utility industry.

Legal action was brought by the utility companies in the Southwest to ward off their threatened destruction. In one case the ten companies in Missouri brought suit in the District Court of the District of Columbia to nullify the contracts entered into between SPA and REA and the G&T cooperatives. (As this is written, the case is now awaiting decision by that court). In another case, four companies serving Arkansas intervened to request denial of a certificate which the super cooperative would require from the Arkansas Public Service Commission before starting construction of either generating plant or transmission lines. The Commission's two-to-one decision to grant the

certificate was carried through the courts; and finally, in a decision rendered by the Arkansas Supreme Court on March 30, 1953, the case was closed in favor of the utility companies and the alliance between Interior and REA in Washington was outlawed.

During the period while these cases were pending, negotiations were entered into between SPA and some of the companies in the Southwest, resulting in two contracts for the purchase of a portion of the power produced at multiple purpose projects by private companies. A third contract which had been negotiated between SPA and a group of twelve companies, covering all the remaining area of the Southwest, went to the Secretary of the Interior on January 11, 1952; and on January 19, 1953, more than a year later and just one day before the inauguration, the Secretary returned the contract to the Administrator of SPA with a very vitriolic attack on all its provisions.

The Future Looks Promising

There is now a general feeling that under the new administration there will be an opportunity to work out an honest, practical solution of the public power-private power feud, not only in the Southwest but all over the United States—to the benefit of the rural electric cooperatives, to the private electric utility companies, their customers and stockholders, and above all, to the relief of the American taxpayer.

Negotiations are now being resumed between the Department and its Administrator, on the one hand, and the companies in the Southwest, on the other, which have great promise. It is hoped that a solution of the problem will be accomplished very quickly, probably by late summer or early fall.

In a bill he introduced last February for the creation of "A Commission to Study Government Competition with Private Taxpaying Enterprise," Congressman Fred E. Busby named forty agencies which are more or less involved in competition with private industry. His statement included a quotation from a speech delivered by Senator Benjamin Harvey Hill before the Senate on March 27, 1878, which said in part:

"I do not dread these (private) corporations as instruments of power to destroy this country, because there are a thousand agencies which can regulate, restrain and control them. But there is a corporation we may all dread. That corporation is the Federal Government. From the aggression of this corporation there can be no safety, if it is allowed to go beyond the bounds, the well defined limits of its power."

America has gone far to the left toward government ownership. Let us hope and pray that it is not too late for us to return to the principles of our fathers.

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POWER PLANT EXPANSION

By-Product Power Generation Proves Feasible at University of Florida

IN THE FALL of 1949 it became apparent that the steam generating facilities at the Central Heating Plant of the University of Florida would be inadequate for supplying heating steam within two years. Accordingly, a study of steam demand was undertaken with the object of providing facilities which would be adequate for the next ten years. At the same time it was proposed to examine the feasibility of by-product power generation. It was found that if steam were generated at 250 psig and saturated (design conditions of the newest existing steam generator in the plant) and utilized in back pressure turbines at an exhaust pressure of 60 psig, approximately 1,500 kw of capacity could be paid for out of savings in approximately five years.

As a result of these studies, it

By GEORGE E. REMP

George E. Remp, P.E., was formerly assistant professor of mechanical engineering, University of Florida, Gainesville, Florida. At present he is power engineer, E. I. du Pont de Nemours and Co., Inc., Wilmington, Delaware.

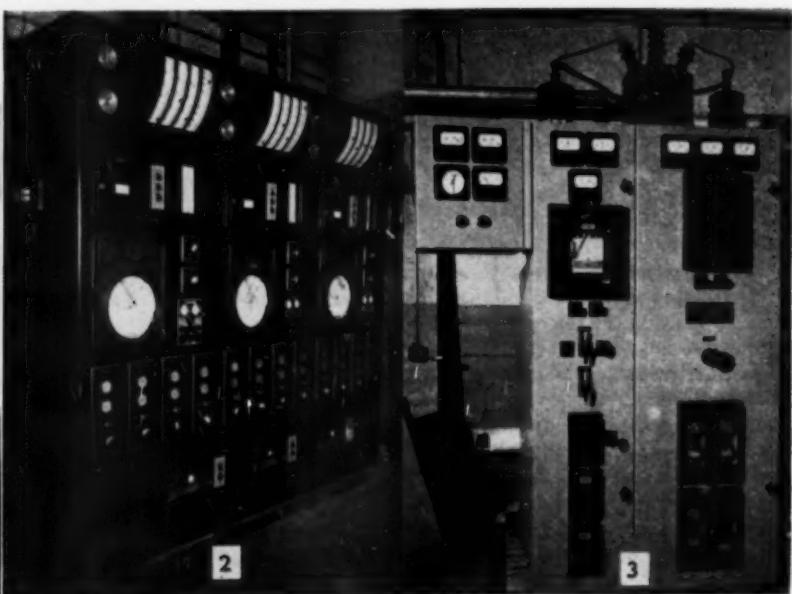
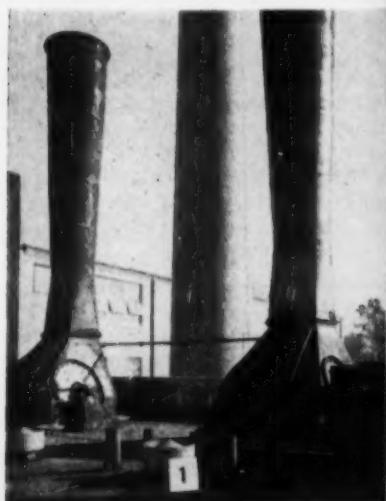
was decided to replace three small heavy oil fired boilers which had been installed in 1926 and 1933 with two new larger steam generators, which, with one smaller steam generator which had been installed in 1947, would bring the maximum continuous steam generating capacity of the plant to 164,000 lb/hr when burning heavy fuel oil. It was decided that at the same time completely automatic combustion and boiler water level controls would be installed in order to bring the control facilities in line with modern power plant practice and to provide for demonstration of typical power

plant operation to engineering students.

The plant expansion program was divided into two phases: steam generator replacement and turbo-generator installations. The first phase was completed in November, 1950, with the initial operation of the two Combustion Engineering Superheater, Type VU-10, 65,000 lb/hr steam generators with associated controls and auxiliaries. The second phase was partially completed in December, 1950, with the initial operation of a 200 kw General Electric back-pressure turbo-generator which had been purchased used in excellent condition. The second phase was completed in January, 1952, with the initial operation of a 1,000 kw Elliott back-pressure turbo-generator.

Fig. 1—Fan stacks for 65,000 lb/hr boilers.

Fig. 2 — Boiler control board. Fig. 3 — Switchboard for main unit.



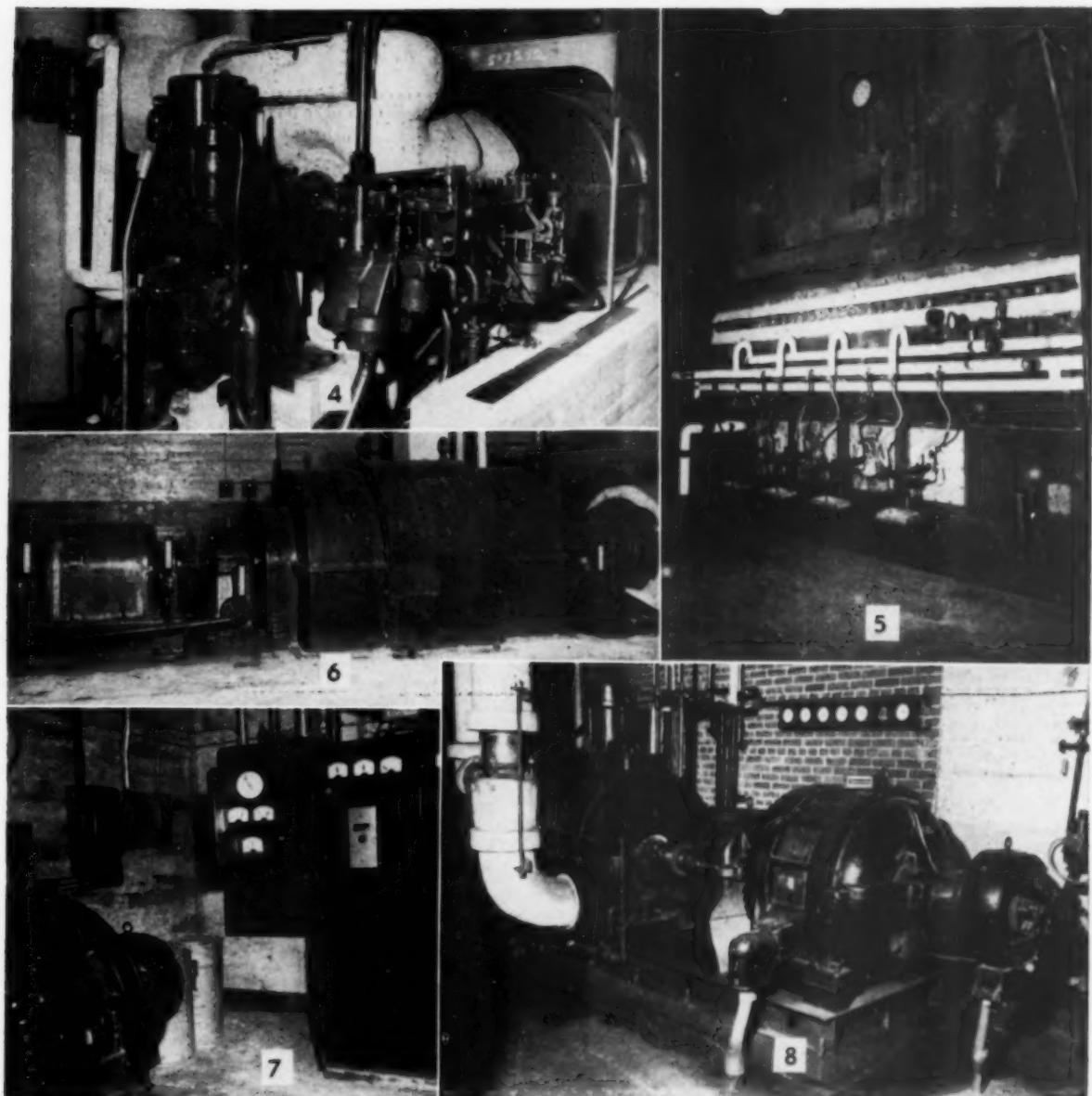


Fig. 4—Main unit, governor end. Fig. 5—Boiler, 65,000 lb/hr. Fig. 6—Main unit, generator and exciter. Fig. 7—Switchboard for house unit. Fig. 8—House unit.

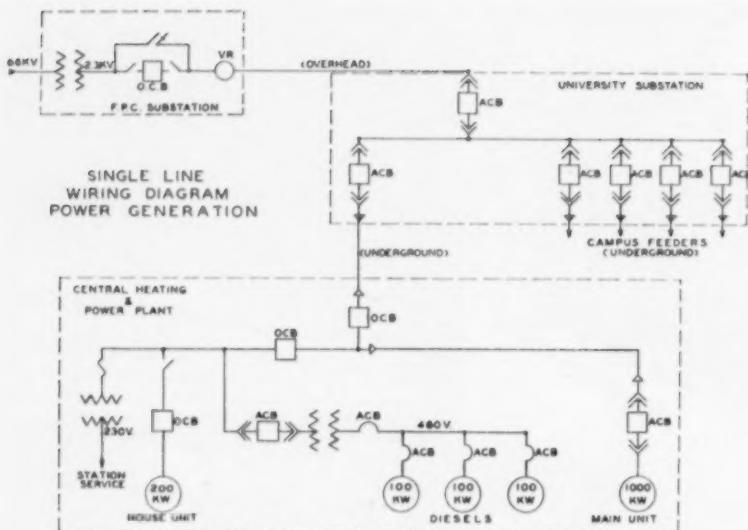
Steam and Water Circuits

Examination of the diagram showing the steam and water circuits will reveal two points which are unusual in plants of this type. The first is the use of pressure filters for the condensate returns to remove suspended iron oxide, and the second is the use of a closed feed-water heater utilizing 60 pound exhaust steam. The filters were necessary because, in spite of the use of volatile amines, the condensate returns from the extensive

campus heating system carry sufficient suspended iron oxide to foul the boilers without filtration. The closed feed-water heater was installed to make it economically possible to pass more steam through the back-pressure turbines and thereby generate more electric power. Actually, the back-pressure units generate power at a fuel cost of approximately 2.5 mills per kwh as compared to an average cost of purchased power of 13.0 mills per kwh.

The 200 kw turbo-generator is

supplied with a speed governor, while the 1,000 kw unit has both back-pressure governing and speed governing so that it may be used either as a variable or constant load machine. In addition, the 1,000 kw machine has one extraction point with air pilot operated control valves which allow extraction to the laundry line so long as the extraction pressure is above 126 psig. At this pressure the turbine extraction is cut off and the laundry is supplied through a reducing station from the main steam header. The



back pressure control on the large turbine is set to maintain 62 psig in the campus heating lines, and when the exhaust pressure falls to 60 psig, due to the inability of the turbines to pass more steam, an air pilot operated reducing station takes over and maintains 60 psig in the campus heating lines by bypassing steam from the main steam header around the turbines.

Electrical Layout

Reference to the single line wiring diagram will show that the University receives its main supply of electrical energy from the 66 kv lines of the public utility through

a 3,000 kva, 66 kv/2.3 kv transformer bank located on the campus. The University substation is of the metal-clad outdoor type supplying four campus feeders through draw-out type air circuit breakers which are provided with overcurrent relays. The power generating facilities at the University include three Worthington-Westinghouse 100 kw Diesel-generators in addition to the 200 and 1,000 kw turbo-generators previously described. These Diesel-generators were installed in 1948 to provide emergency power for essential services, such as the Heating Plant, University Infirmary and the University Cafeteria which

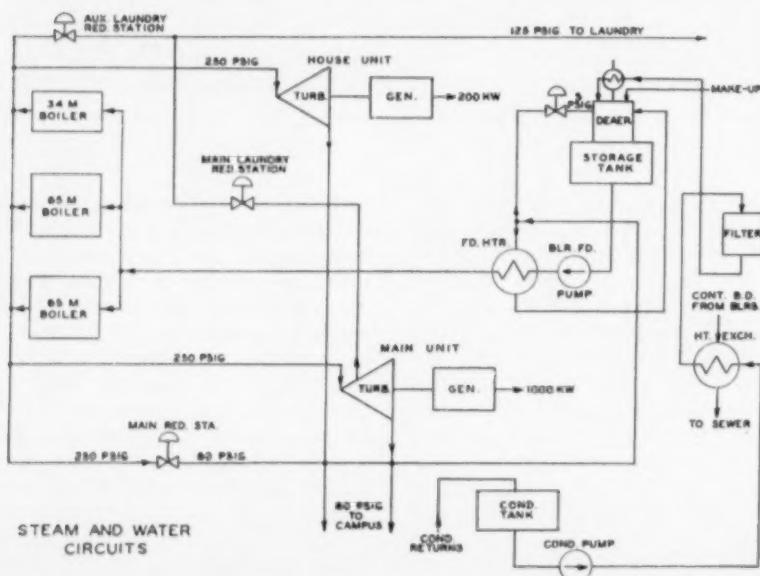
maintains a frozen food inventory valued at approximately \$75,000. The present layout preserves the emergency status of the Diesel-generators. The 200 kw turbo-generator is provided to insure continuity of station service and to assist the Diesel-generators during emergency periods when the main unit may be available at the same time that the private utility supply is interrupted. Thus, the emergency facilities are always available to the University even if hurricanes interrupt the utility company lines, because the campus electrical system is completely underground.

The Central Heating and Power Plant building was started in 1926, and in 1939 the original sheet metal building was replaced by a brick structure, and the plant was converted from coal to oil firing. The boiler plant was originally served by a 150 ft high by 6 ft diameter radial brick chimney, but it was retired in favor of stub stacks for the individual boilers.

Instrumentation

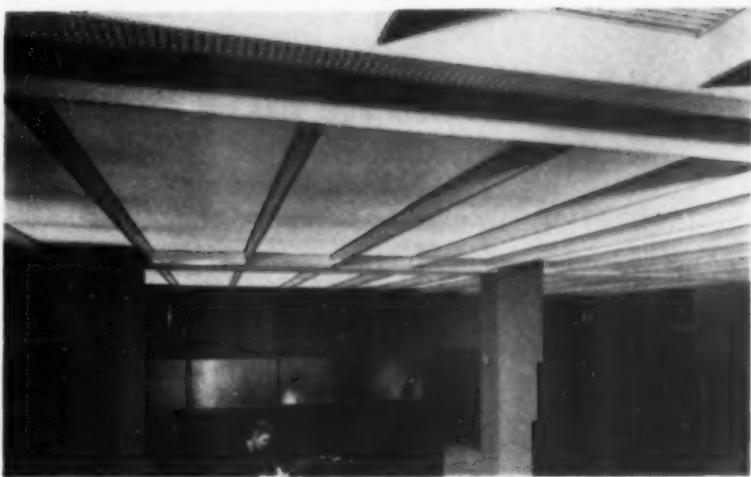
The plant was instrumented with the object of using it as a laboratory for mechanical and electrical engineering students. The boilers are equipped with Republic pneumatic combustion controls and Swartwout single element pneumatic feedwater controls. Metering by Bailey, Brown and Republic covers boiler output, turbine throttle flow, condensate flow and feedwater flow. Neptune oil meters are installed on each boiler as are Ess hazegages. The turbines have pressure gages placed at all significant points, such as the throttle, exhaust and nozzle bowls. Recording and indicating thermometers and pressure gages are installed at necessary points throughout the plant. Each generator is equipped with the usual indicating instruments and, in addition, the house turbo-generator and Diesel-generators have integrating watt-hour meters and the main turbo-generator has an integrating and recording watt-hour demand meter.

The writer wishes to acknowledge with thanks the able assistance during the plant design and construction of Mr. J. W. Bishop, former Plant Superintendent, and Mr. E. A. Bennett, Plant Foreman.



Here's the Lighting Sales Dept. of the Chattanooga Electric Power Board, Chattanooga, Tenn. Prior to this attractive Acusti-Luminous ceiling installation, unsightly air-conditioning ducts, beams, etc., were exposed. They are still accessible if need be by merely rolling back the corrugated plastic. Sounds are muffled by acoustical fins, which also serve as shielding louvers.

Ceiling Area—3,068 sq ft; Lamps Used—374-40 watt C/W fluorescent lamps; Lamps Spacing—18 in. center to center; Old Ceiling Height—11 ft, 6 in.; Luminous Ceiling Height—9 ft. Acusti-Luminous Ceilings are manufactured by Luminous Ceilings, Inc., Chicago 47, Illinois.



A RECENT Acusti-Luminous ceiling installation at the Chattanooga Electric Power Board, Chattanooga, Tennessee, is illustrated below. The light-weight ceiling diffuses the room illumination over the entire ceiling area. At the same time, acoustical baffles, spaced at proper intervals, give the room a high degree of acoustical correction.

Maintenance is very simple and low in cost. Plastic is merely

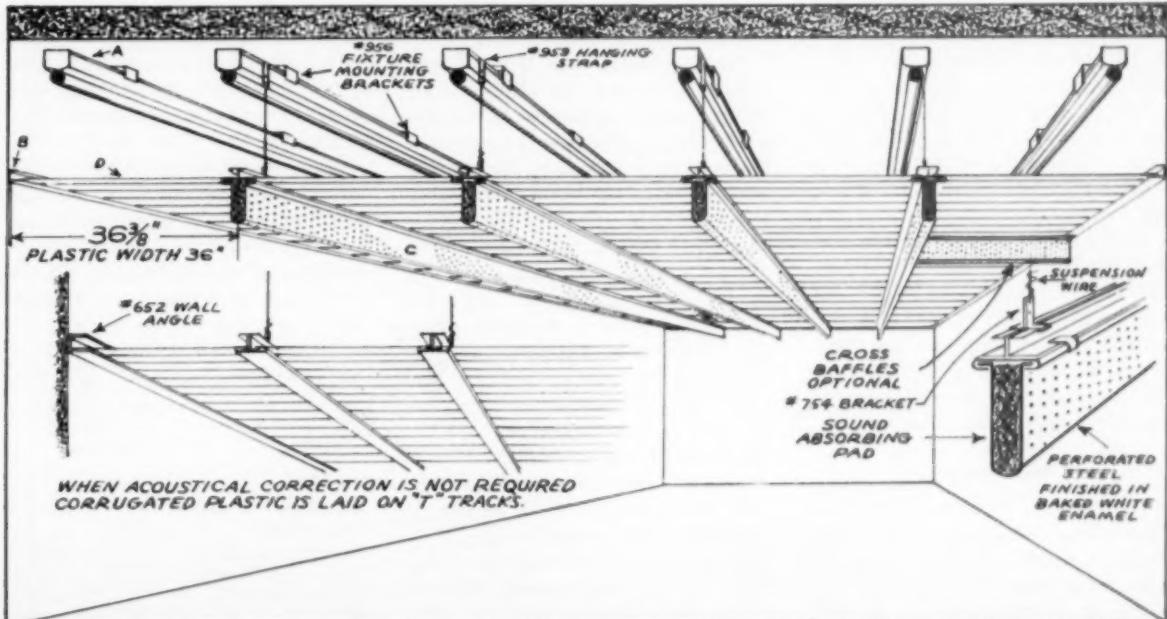
Dual-Purpose Ceiling

Ceiling design improves lighting and acoustics in Chattanooga Electric Power Board offices.

rolled up for washing and may be rehung to dry. The plastic does not support combustion and is practical for all room temperatures. Unlike ordinary lowered

ceilings, no extra sub-sprinklers are necessary. The ceiling will give way to water from a sprinkler system, and also at a temperature of 140 to 150 F.

Lighting system consisting of single fluorescent strips (A) or special multiple cross troughs are attached to or hung from ceiling which has been painted white. Wall angles (B) are then attached level around perimeter of room. Acoustical fins or baffles (C) are bolted on 36 $\frac{1}{8}$ in. centers and supported with wire at couplings on 8 ft intervals. Plastic (D) is then unrolled and lays in track being held firmly in place with plastic retaining rings at ends and at both sides of open section.



USE OF AMINES IN LOW MAKE-UP STEAM PLANT

Initial results are so encouraging that, following annual inspection, it is planned to start the same treatment in all units of this plant.

CENTRAL Louisiana Electric Company is a relatively small utility furnishing electric service to the Central area of the State of Louisiana and also to sections extending almost to the Northern boundary of the state and to the Gulf Coast on the South.

Coughlin Station, our Company's major source of power, is a steam-electric station located approximately in the geographic center of the state. This paper is concerned with our experiences in the control of iron pick-up by the use of Amine treatment in our No. 3 unit in this plant.

This unit was placed in operation in August of 1949 with steam conditions at the throttle of 600 psig, 825 F. The equipment consisted of a 10,000 kw condensing turbine obtaining steam from a 120,000 lb/hr, Combustion Engineering type VU boiler. The boiler is equipped with a tubular type air pre-heater; however, an economizer is not employed.

All makeup (approximately 1 per cent) for this unit is obtained from a bent-tube evaporator discharging its vapor into a deaerating heater.

An interconnected system of four 10,000 gallon condensate storage tanks for the plant provides maximum flexibility of make-up control. In addition to the conventional deaeration supplied by the heaters, all condensers are equipped with deaerating hotwells.

Well Water

Initially, all feed for this evaporator was obtained from deep wells, located on the property, with no provisions made for softening or pre-treatment of the well

water. However, it was treated internally with phosphate, a lignin organic and sodium sulphite. The phosphate was fed at the deep well pump discharges for iron stabilization and the organic and sulphite "slug" fed to the evaporator shells. Later, continuous feed of these chemicals were resorted to which provided much better control.

Table I

	ppm
Total Hardness (As CaCO ₃)	164
Calcium (As CaCO ₃)	93
Magnesium (As CaCO ₃)	61
Alkalinity (M.O.)	191
Free CO ₂ (As CO ₂)	9-26
Chloride (As NaCl)	41
Sulfate (As Na ₂ SO ₄)	0-2
Silica (As SiO ₂)	25-35
Iron (As Fe)	0.5-2.0
pH	7.1-7.5

Table I gives a typical analysis of the deep well water, from which, it is obvious that the "free" and potential carbon dioxide in this water is very high.

From 1948 through 1950, observations of carbon dioxide content of the system indicated that undesirably high amounts were present. For example, conductivity of the condensate at the hotwell was consistently 1.5 to 2.0 micromhos while steam samples at the boiler drum, corrected for gases, ran about 0.4 to 0.5. Steam samples are run through a Straub degasifier and results are recorded continuously.

During this time, periodic analysis of the condensate revealed 3.0 to 3.5 ppm of carbon dioxide. Since the plant is equipped with excellent deaeration facilities this was considered to be an excessive amount. In addition to this, casual observation of the iron content of the system indicated a gradual but definite increase, pre-

By H. J. GUILLORY*

Superintendent of Production
Central Louisiana Electric Co., Inc.
St. Landry, Louisiana

*Presented at the fifteenth annual meeting of the American Power Conference, 1958.

sumably a direct result of excessive carbon dioxide.

Carbon Dioxide Problem

Thinking that we should attack the problem before trouble occurred, it was decided to make some effort to minimize carbon dioxide and consequently, iron. Our belief was that the evaporator feedwater could best be treated for the removal of excess carbon dioxide with an acid regenerated zeolite, followed by degassification and neutralization with caustic soda.

Consequently, in the latter part of 1950 such a unit was placed on order and put into operation in July of 1951. Results were immediately apparent as the carbon dioxide in the system was reduced to reasonable values. Soon after this unit was placed in operation, conductivity of the condensate at the hotwell was reduced to a steady 0.6 micromhos and carbon dioxide at the deaerator discharge decreased from approximately 3.5 to 1.5 ppm.

For a comparison of the results obtained after installing the water softener, table 2 gives a typical analysis of the feed to the evaporator after caustic soda addition to the softener degasifier effluent.

Table 2—Feed to Evaporator

Acid Regenerated Zeolite effluent, after degassification and addition of caustic soda, sulfite and lignic organic.

	ppm
Total hardness (As CaCO ₃)	0- 4.0
Alkalinity (M.O.)	10-40
Free CO ₂	2- 6
Chloride (As NaCl)	35-45
Sulfite (As NaSO ₃)	55-75
Silica (As SiO ₂)	25-35
pH	7.0- 8.0

Although conductivity and other records proved that considerable progress had been made, continued observations of pH at the deaerator discharge and carbon dioxide at the hotwell indicated that a small but definite residual of carbon dioxide still remained in the system. Iron reduction, while not spectacular, was definite. Records of tests conducted on the feed-water leaving the deaerator and the boiler water indicated that the iron content was reduced to slightly less than half of that found before putting into operation the acid regenerated zeolite water softener.

It was anticipated that ammonia concentrations in the entire system would also be efficiently reduced after this pretreatment of the evaporator feed was resorted to. Subsequent to the pre-treatment of evaporator feed only occasional traces of ammonia could be found in the condensate. Previous to this, these concentrations ranged from 0.05 to 0.2 ppm. However, pH values increased only slightly. Previous to the pre-treatment, pH of the condensate at the deaerator discharge ranged from 6.3 to 6.5. After this considerable reduction in carbon dioxide and ammonia the values increased to 6.6-7.0.

This program, primarily aimed at reducing corrosion in the system, was obviously a great step forward. While no serious problems had been encountered that could be attributed to corrosion only, we did experience considerable difficulty with heater drains. However, this type of problem is difficult to tie down and was probably caused more from erosion than anything else. While internal conditions in the major equipment showed no unusual amounts of iron oxide deposits, we believed that it was possible to still further reduce corrosive tendencies prevailing in the water cycle and consequently the iron content of the system.

Methods Considered

At that time we thought it feasible to consider four methods of further reducing the carbon dioxide and increasing the pH in the cycle. The following is a summary of the methods considered and rea-

sons why they were discarded or accepted.

1. **Ammonia**—Infrequent copper tests made indicated that no serious amounts had ever been present in the system. Since there is considerable controversy with respect to the possible effect of this type of treatment on the copper and copper bearing alloys that are always present in such a system, this was ruled out.

2. **Caustic Soda**—Since the only blowing down of the boilers in the past was that incident to the cleaning out of the blowdown line preparatory to taking samples for water analysis this was also discarded because of the possible greater blowdown that would be required by employing caustic soda.

3. **Evaporator Preheaters**—Very serious thought was given to the purchase of evaporator preheaters just prior to the installation of our No. 4 Unit. Proposals were obtained from manufacturers that would provide the feed to the evaporator with zero carbon dioxide. This would entail considerable capital investment in providing preheaters for both evaporators. We also felt that we would not obtain very much increase in pH of the condensate. Taking these factors into consideration it was felt that, because we had had no serious corrosion problem in the past, the expenditures involved could not be justified, thereby eliminating this possibility.

4. **Amines**—The rejection of the other types of treatment left us with Amines as the most desirable way of ridding our system of the remaining carbon dioxide and also instituting a reliable means of pH

control without an attendant heavier blowdown as would be caused by using caustic soda or an undesirable concentration of ammonia as would, in all probability, result from the use of this chemical. As a consequence of this, it was definitely decided to resort to a Morpholine type of Amine on our No. 3 Unit for elevation of the pH to the range of 8.5 to 8.8 at the same time keeping a close watch on ammonia concentrations and any increase it may occasion in the copper content of the cycle.

Amine Treatment

Late in 1952, therefore, this Amine treatment was put into effect. Chemical treatment for all of the Units is made at two points. A lignin derivative and catalyzed sodium sulfite are injected into the discharge pipe from the storage tank of each deaerating heater by means of Milton Roy chemical feed pumps. Supplementary lignin organic, caustic soda and disodium phosphate are pumped directly into each boiler drums by the same type of pump.

The continuous recording pH meters employing glass electrodes take samples of water immediately below the storage section of each deaeration heater. The chemical feed for the lignin organic and catalyzed sodium sulfite is also located on the deaerator discharge pipe but some distance downstream below the pH sample take-off. It was felt that this would be the simplest point of application for this chemical at the same time providing for measurement of the pH after the Amine had gone through the com-

(Continued on page 59)

Table 3

Summary of Analyses of water samples before and after installation of water softener and after use of Amine. All results in ppm.

Deaerator Discharge	Carbon Dioxide CO ₂ (As CaCO ₃)	Ammonia		Total Iron		Copper
		As N	pH	As Fe	Less Than	
(1) Before softener	3.0-3.5	0.05-0.2	6.3-6.5	0.5-1.0	0.1	
(2) After softener	1.3-1.7	0	6.6-7.0	0.3-0.4	0.1	
(3) After Amine	0	0-Traces	8.5-8.8	Trace-0.1	0.1	
Boiler Water					6-7	
(1) Before softener					2-3	
(2) After softener					0.8-1.6	
(3) After Amine						

Nashville Company Cuts Costs by Converting to

Assembly Line Wirebound Crating

A WHOLESALE revolution for better production in packing-for-shipment operations is taking place at one of the South's oldest and best known industries, the Gray and Dudley Co., Nashville, Tenn.

Better production methods continually sought and achieved by the heads of the big company, which now sprawls over 20 acres in Nashville, have been largely responsible for its steady and impressive growth.

Established in 1862, the 90-year-old company has built an enviable reputation as a maker of quality home ranges and heaters. Its products now include electric water heaters, gas and electric ranges, oil circulators, coal circulators, ranges and spare parts for the armed forces, and cast iron domestic ranges, the latter modernized and streamlined by being largely sheathed in gleaming white porcelain enamel. The products are

Seventeen designs and sizes of prefabricated wirebound wood crates used to pack forty-seven sizes and models of water heaters, ranges and coal circulators.

marketed largely under the company's "Washington" and "Martha Washington" brand names and trademarks.

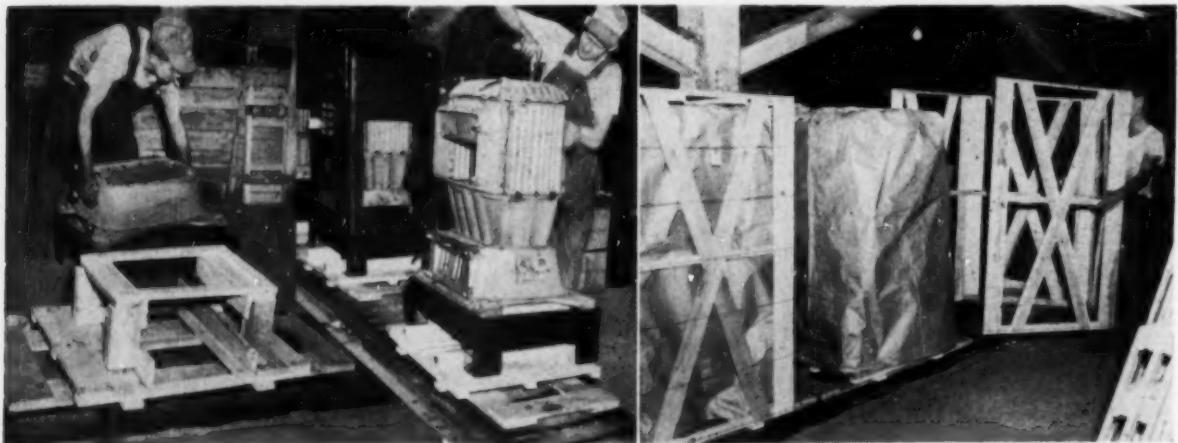
Standardization

The traffic department now directed by E. I. Jones has kept pace with the company's over-all better production program by standardizing upon shipping containers, including the adoption of 17 different designs and sizes of prefabricated wirebound wood crates to pack a total of 47 different sizes and models of electric water heaters, electric and gas ranges, oil circulators, coal circulators, cast iron

ranges, and spare parts for army ranges.

The new packing-for-shipment technique for better production was achieved by close teamwork between R. E. Grimsley, vice-president and general manager; Harry C. Calahan, plant superintendent; Earl Hart, plant production engineer, and Jones, on the one hand, and skilled wirebound shipping container engineers, on the other hand, after wirebound crates had proved to be all-around superior economical shipping containers for 539 lb Model 529 general coal circulators and 468 lb Model 25 general cast iron ranges.

The 539 lb coal-fired heater made by the Gray and Dudley Co., Nashville, is assembled on the base of the wirebound crate that will carry it in shipment. It emerges from the assembly line ready to be shipped. The entire unit is kept from shifting during shipment or handling by the sturdy built-up base of the wirebound crate snugly engaging and fitting the base of the circulator. Before converting to the wirebound procedure crates were individually cut and nailed together, a costly, time consuming, and noisy process. By thus simplifying the crating operation and at the same time eliminating shipping damage due to container failure, the company executives find they have slashed over-all packing costs for this unit by 13 percent, including a reduction in man time from 36 to only 6 minutes.



Previous Method

For many years, the company nailed together its own wooden crates for the products now shipped safely and economically in their specially engineered wirebound wood crates. Crating usually took place after the article had been assembled and reached the end of the production line, although some were crated as they were assembled.

In either case, the packing area became congested unless additional workmen were assigned to crating, or production lines were slowed annoyingly as crates were laboriously cut from raw lumber, assembled, and nailed together. Also, the crate-making caused nerve-wracking noise that often disturbed even the office force and resulted in sawdust and other debris that presented both a fire hazard and a disposal problem.

Crating electric water heaters is a speedy and economical process now that the company has converted to the use of wire bound crates. The heaters are assembled on the bases of their shipping containers. As they reach the end of the assembly line, they are crowned with a layer of protective material that is tied with cord. Then they are packed for shipment in only 3 man-minutes. A one-piece wirebound "mat" that comprises the four sides of the crate has been easily folded into shape and is being placed in position here. The workman lifts the folded "mat" over the top of the heater so that it is quickly in position for the crate top to be placed, and then the crate is closed by engaging and twisting the ends of the binding wires of the "mat."



Table 1—Savings in Crating "Betty" Coal Range

	Old Style Crate	Wirebound Crate	Pct. Reduction
Man-time needed to pack:	27 minutes	5.5 minutes	80%
Container tare weight:	67.5 pounds	35 pounds	48%
Shipping weight:	342 pounds	309 pounds	10%
Over-all crating cost:	\$3.10	\$2.59	16%

Table 2—Savings in Crating Coal Circulator

	Old Style Crate	Wirebound Crate	Pct. Reduction
Man-time needed to crate:	36 minutes	6 minutes	83%
Container tare weight:	87.5 pounds	65 pounds	26%
Shipping weight:	626.5 pounds	604 pounds	4%
Over-all crating cost:	\$5.60	\$4.85	13%

No appreciable inventories of pre-cut parts for the many different sizes and styles of crates could be kept on hand so that each individual crating job was tantamount to a project within itself. Controlled uniformity of quality and close precision of crate making were all but impossible to achieve or maintain.

Hence, as it has since been discovered, crate-making resulted in excessive and costly tare weights and comparatively frequent shipping container failure during shipment or handling.

Continued Improvement

The traffic department's packing
(Continued on following page)

The table-top heaters (left) and conventional heaters (below) are packed in the same manner. By the use of these scientifically engineered wirebound crates the Gray and Dudley Co. has slashed packing time 75%, reduced container weight 57% and shipping weight 17%, and over-all packaging cost has been cut by 15%.



for-shipment revolution for better production has not resulted from snap judgment. It grew out of long experience with scientifically engineered wirebound crates which the Gray and Dudley Co. adopted first 15 years ago for a 290 lb gas range and six years ago for 330 lb cast iron ranges.

Shipment of these products in wirebound crates with no shipping damage due to container failure

under ordinary shipping shocks, jars, and handling convinced the Gray and Dudley Co. executive team that better general all-around packing, pronounced economies, elimination of shipping damage, and vastly improved packing room production would result from the adoption of scientifically engineered wirebound crates for other products of the company.

Among the convincing arguments

for the adoption of wirebound crates for other Gray and Dudley Co. products were the comparative "before and after wirebounds" figures for the 274.5 lb "Betty" coal range. See Table 1. And continued success of the traffic department's better production program is indicated by the typical "before and after" statistics for a more recent conversion, that for the Model 529 coal circulator. See Table. 2.



Fig. 1. Aerial view of the Statesville Manufacturing Company plant at Statesville, North Carolina.

Better Handling Cuts Costs

Statesville Manufacturing Company—North Carolina

By WILLIAM L. ALLISON, JR.

OUR old procedures at Statesville Manufacturing Co. needed improving because we felt that the cost under the old set-up was prohibitive. Handling costs were steadily on the rise due to the increase in the cost of labor. We had to reduce our labor and yet increase our production to meet a highly competitive market. The lack of land for storage space prevented us from building up a balanced inventory of dry framing lumber.

Our first step was the purchase of a Hyster 150 fork lift truck with 7 ft 6 in. forks. (Fig. 2.) We arrived at this length because we could load and unload uniform packages on trucks and kiln trucks.

This width permits us to load the bed of our trucks evenly making use of the maximum width of the truck bed.

We then set about to build our operation around the lift truck. We completely rebuilt our yard, leveling it off and covering it with crushed stone. Our next step was to design a special concrete foundation block to stack our lumber on. We wanted a block that we could move easily and yet be strong. We built the forms and cast the blocks out of ready-mixed concrete. The initial cost of these blocks was much higher than wood footings, but over a long period we think they will be cheaper than wood. These piers are

easily moved about with our lift truck.

These piers furnish us with a good sound base that could not be obtained with wood. (Fig. 3.) This permits us to stack our lumber 24 ft in the air without the danger of having hacks lean or topple over. This also permits an easy operation for our lift truck and thus speeds our entire operation.

Our next step was the removal of our trim saw and resaw from our main shop to a specially designed building on our yard. A conveyor system was installed under our trim saw to carry the blocks to a portable bin. (Fig. 4.) A complete dust system pulls the sawdust from the trim saw and the resaw and empties it in the bin with the blocks. The bin, when full, is carried off to the boiler house by the lift truck and dumped. This saves many manhours of cleaning and sweeping up the waste and eliminates all the man-handling except firing the boiler.

All lumber is graded according to lengths, widths and thickness as it comes on the yard. (Fig. 5.) After this sorting the lumber is

double end trimmed and graded as it comes off the resaw. This step gives us neat hacks and we are able to stack our hacks closer together, because it leaves no ragged ends to contend with.

The green lumber is cut one inch longer than the net length to allow for shrinkage as it dries. It is then "hacked" in specially designed hacking boxes (Fig. 6) which square the ends of the "hacks" and evenly space the hacking sticks. (Fig. 2.) We then stack it with the lift truck to dry.

Each hack is marked with the

date so that we can tell at a glance how long it has been drying. When it is dry we put it through our kilns or run the material through our moulders or planer. We manufacture architectural millwork, framing lumber and wood trusses.

The renovation of our yard has resulted in many improvements. We have reduced our yard personnel by four men. We now handle almost three times the amount of lumber that we handled by the old method. At the same time we are able to process about four times as much lumber at a reduced cost. We now

have in our inventory about one million feet of framing lumber on the same space where we used to stack about one-quarter of a million feet.

Under the new system we have such mobility with our hacks that we do not have to keep any of our lumber in the open after it has dried. Under the old system of stacking lumber by hand we had a great deal of waste in the lumber that was stacked closest to the ground. With our new system we are able to give better service and a higher grade of merchandise.

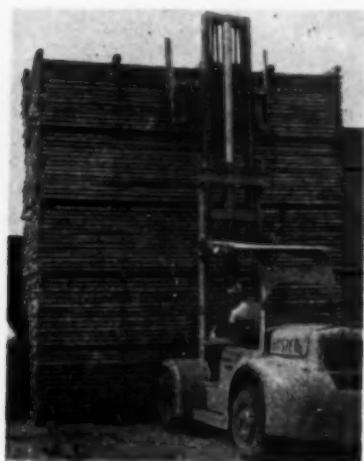


Fig. 2—above



Fig. 3—above, right



Fig. 4—below



Fig. 5—right



Fig. 6—below, right

GRAPHITIZATION

Repairing Graphitized Welded Joints in Carbon Moly Pipe—Dow Chemical

By **JAMES P. WARREN**, Power Consultant, Texas Division, Dow Chemical Company



James P. Warren

Mr. Warren joined the Dow organization in September, 1942, as superintendent of power for Dow Magnesium Corporation. He is now power consultant of the Dow Chemical Company's Texas Division.

His earlier career included 35 years experience in power plant operation and construction work. Mr. Warren is a member of A.S.M.E., in which he has held several offices, and he holds patents on a chlorination process and a wind pressure gauge. He is a licensed professional engineer in both Texas and Florida.

FOLLOWING the failure in 1943 of a welded joint in a high pressure, high temperature steam lead in the Springdale Station of the West Penn Power Company, re-

ported in the ASME Transactions 66, 1944. The Dow Chemical Company, as many others had done, started a review of the methods under which the piping installed was

manufactured. An investigation was also initiated to determine if graphitization existed in welded joints in carbon moly piping in service under 1250-1300 psi and 900-930 F conditions in No. 2 power plant of the Texas Division.

It was the consensus of opinion of metallurgists at that time that graphitization was less likely when carbon moly welded joints were operated under 900 F and there was insufficient evidence that stress favored graphitization or at least it was not an important factor. So, with this the best available knowledge, the temperature in the carbon moly lines was reduced to approximately 880 F at the turbine throttle. We were still concerned about certain areas of the carbon moly piping since the temperature at the superheater header varied on the order of 925 F to 890 F and at the manifold and header valves from 910 F to 890 F. The specifications under which this piping was purchased are as follows:

"All materials furnished and all procedures followed in fabrication of pipe shall, unless otherwise specified, conform to the latest issues of the adopted and tentative specifications of the ASTM and American Standard Code for Piping and the ASME Boiler Code. All pipe 1500-S-3 shall be seamless carbon moly steel ASTM A-206 Grade P1."



Cavity in a carbon moly weld where a boat sample was removed for examination. Pipe department engineers used a weld probe sampler so that cuts would not be made through the entire pipe wall. Adjustments can be made to leave $\frac{1}{8}$ in. inner wall, thus saving chill ring installation and reduce clean out work necessary following welding.

The manufacturer supplied the analysis of the material used as shown below.

C	Mn	P	S	Si	Mo
.19	.45	.011	.019	.195	.49
.18	.55	.015	.022	.25	.52
.17	.47	.012	.033	.23	.50

The deoxidation of the above heats were respectively .5, .6 and .6 lbs. Al/ton and the information available then was that "killing" with .5 lbs. Al/ton made carbon moly steel resistant to graphitization.

Sampling Technique

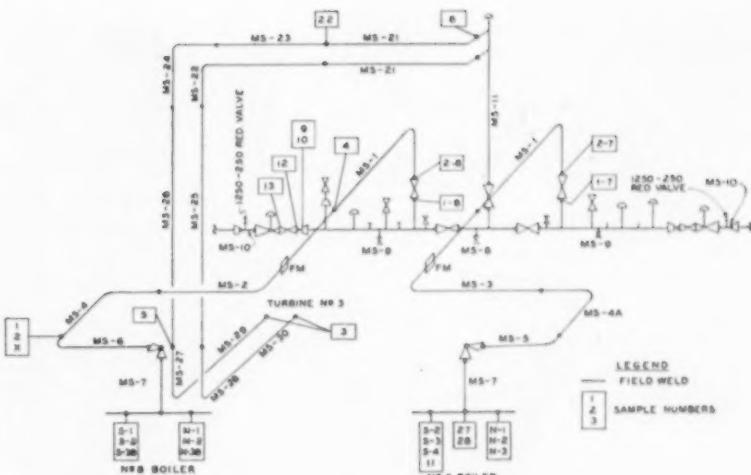
Sampling to determine if graphitization existed was not done earlier because we felt reasonably secure when operating at the lower temperature, also the war and defense programs imposed heavy demands upon our power system, so plans were made to remove samples from welded joints in carbon moly piping at the first opportunity during a planned outage.

In December 1951, planned outages indicated sampling might be done in February 1952, so having the advantage of the valuable information presented by Messrs. Rohrig and Van Duzen, of the Detroit Edison Company, in *Combustion* of January 1952, we developed a program of investigation much the same as they had followed in Detroit.

A device designed to remove boat shaped samples from welds was purchased and sampling was handled by our pipe department engineers.

The weld probe sampler was selected so that cuts would not be made through the entire pipe wall, as adjustments can be made to leave $\frac{1}{8}$ in. inner wall, thus saving chill ring installation and reduce clean out work necessary following welding. The boat sample provides sufficient material for further cutting into specimens for metallurgical examination and bend tests. The center cut from the sample, which is about $\frac{1}{8}$ in. wide, is used for the bend test by local metallurgist as well as metallographic examination. The two outer sections were sent to different laboratories for metallurgical studies and thus we had the value of knowledge from two sources.

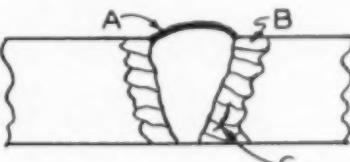
Graphitization occurs in the area



Graphitization Sample Location

Main Steam Line, Plant B 1000, Texas Division, Dow Chemical Company

of the heat affected zone of the pipe or parent metal about as indicated by the sketch.



A—Weld; B—Heat Affected Area; C—Graphitization about this point.

The piping sketch shows the general layout of the 1250-900 system and symbols and numbers refer to sections of the piping and sampling points.

Sample Analysis

The first sample was from the weld at the right of MS-6 on the steam line sketch, this being the high temperature zone. The photo-micrographs indicated severe chain graphitization.

Following this report, samples were cut from the superheater header or the zone of the highest sustained temperature. It was interesting to note that none of the first three specimens removed at S-2, 3 and 4 on No. 7 boiler lead showed signs of graphitization. In fact, there was no serious quantity of graphite reflected in any other superheater header weld.

A sample taken from the boiler steam lead revealed moderate graphitization and random distribution.

It was decided to take one more sample from No. 7 superheater header—11. Photomicrographs showed slight evidence of nodular graphite.

At point 12 on steam line drawing, nodular graphite was in evidence and on the other side of the valve at 13 nodular graphite was shown in the carbon moly pipe but there was no evidence of graphite in the valve body.

The samples taken at 2-7 on a boiler lead valve revealed severe graphitization which included some chain type and large amounts of nodular graphite.

At sample point 1-8 large amounts of nodular graphite justified the classification of severe graphitization. In a relative zone on the opposite side of header valve at 2-8, again large amounts of nodular graphite was in evidence along with some chain type, so this was classified as severe graphitization.

The laboratory studies of grain size showed that the material is in the fine grain category which indicates that it was deoxidized with aluminum in addition to prior silicon addition.

Generally speaking, the graphitization in this piping followed the temperature gradient and it may not be necessary to change out the 10 in. lead lines to the turbine if the temperature is maintained at the level below 900 F. Periodic sampling and metallographic ex-



Fig. 1 above; Fig. 2 below.

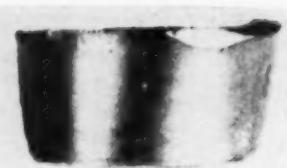
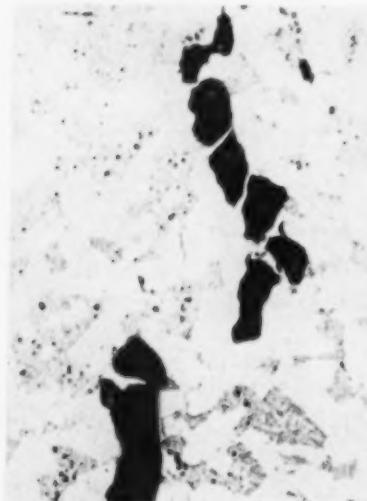


Fig. 3 above; Fig. 4 below.



aminations planned will prove or disprove this.

At the present, the 10 in. leads to the turbine will remain, also the original valves; however, all 4, 12, and 14 in. carbon moly was replaced by chrome moly material.

Stone & Webster Engineering Corporation was engaged to advise on the program to be followed for

purchase and installation and their construction department under Mr. J. M. Goff removed carbon moly pipe from the header system, changing to chrome moly piping.

Welding Methods

All welding on the temporarily repaired sections was done by our pipe department in accordance with



Here's how metallurgical examination can disclose excessive graphitization.

Fig. 1 is a normal photo of a polished specimen. Photomicrograph (Fig. 2) is the 100x magnification of a small area of the crack in the left of Fig. 1. Note heavy graphite.

Large black areas are graphite particles that have migrated to a "pool" or chain of solid graphite. This weakens the section affected. Small black specks are graphite particles flowing toward the large accumulations or chain of large black spots.

Fig. 3 shows bend test of another boat sample. Note absence of fractures.

Fig. 4 is a photomicrograph of the heat affected zone of this specimen. There is no evidence of graphite formation or accumulation. Grain structure appears normal.

standard practice, preheating and interpass temperature of 500 F, heating and cooling rate 300 F per hour, stress relieving temperature 1350 F and holding time one hour per $\frac{1}{4}$ in. wall thickness.

One sample was cut from the pipe where the highest stress point was indicated (not at a weld), and the metallurgical report disclosed no graphitization. This was at MS-4X, which is in the relative zone where sample box indicates 1-2-X.

All cavities where boat samples were removed were welded then stress relieved by peening and heating local areas with an acetylene torch. All welds were radiographed and it was necessary to rework four welds. Restraining members were necessary to maintain piping alignment when washing out old welds with a gouging torch and rewelding the joints.

One half of the header was kept in service following the temporary repair while one half was being changed from carbon moly to chrome moly.

Chrome moly seamless drawn steel pipe of specification A-280 with chrome $\frac{1}{2}$ per cent, moly $\frac{1}{2}$

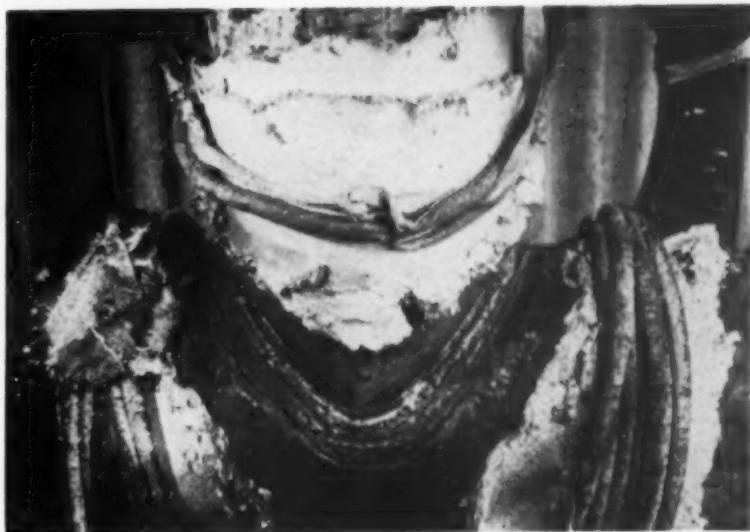
This is a tee weld in progress on the temporary repair after flame gouging to remove the graphitized area. In order to remove graphitized areas for rewelding, the flame gouging process may remove so much material that it is better to use an insert section of pipe and make two welds rather than fill an exaggerated V with welding rod. This method is more acceptable to code procedure.

Here is a partial weld at a 14 in. tee with preheating coils and a part of the heavy restraining members used to maintain alignment.

per cent was supplied for 12 in. and 4 in. pipe and the 14 in. header was specified to meet ASTM specifications A-315 with chrome 1 per cent and moly $\frac{1}{2}$ per cent. All carbon moly piping from 4 in. to 14 in. was replaced with chrome moly with no change out at this time of valve bodies or fittings.

To prepare valve bodies for the new piping and to remove the graphitized areas, they were machined from 1 to $1\frac{1}{2}$ in. shorter in face to face dimensions. Future examination of specimens from body welded joints will determine the need of the change out of valve bodies. Should the recent extensions made to the plant raise the temperature level in this header, a complete valve body change out may be required.

While the boat sampling device is satisfactory for cutting samples from straight welds, it is not readily adapted to certain other welded areas such as valve bodies, tees, etc., and our engineers are developing a plug type trepanning device that will bottom out near the inner wall and not cut through.



With such a device a quick check can be made of valve bodies and other areas not accessible to present sampling equipment.

The operator is not in favor of taking chances on spelter or other foreign material being left in steam lines under normal welding operations, so every effort should be put forth to leave a thin section of inner walls for protection.

A record was made in the change out time from carbon moly to chrome moly piping by our contractor, Stone & Webster, and the cooperation of the Grinnell Com-

pany was a large contribution to the excellent job done.

We acknowledge the help of *Stone & Webster*, the *Grinnell Company*, *Mr. H. W. Schmidt*, of the *Dow Chemical Company*, Midland, Michigan, *Mr. D. H. Corey*, of *Detroit Edison*, our pipe department engineers, *A. D. Rust*, Consulting Engineer of *Dow*, Texas Division, and *Mr. W. B. Brooks*, Metallurgical Engineer, *Dow*, Texas Division.

Selected Bibliography—Transactions, ASME, 1944, Vol. 66; 1945, Vol. 67; 1946, Vol. 68: I. A. Rohrig and R. M. Van Duzen, Combustion, January, 1952.

Use of Amines—Central Louisiana Electric

(Starts on page 50)

plete plant cycle.

In order to "charge" the entire system, 475 to 500 milliliters of the Amine was fed with the lignin derivative and sulfite to the discharge of the No. 3 deaerating heater each day. pH was increased to approximately 8.6 on the 8th day of operation.

After approximately 2 months the dosage of the Amine was gradually decreased but placed on chemical "batch" basis so that a definite amount of it was added each time the chemical feed tank is charged with sulfite and lignin organic. This resulted in a continuous feed which held pH at a more or less constant value of 8.6. At present this value is being main-

tained with 100 milliliters of Amine being fed per 24 hour period.

The greatest possible attention to iron has been placed on deaerator discharge samples. Frequent analysis for total iron, made by accepted photometric methods showed a gradual but definite decrease. After approximately 3 months of operation with the Amine in the system, the iron in the feedwater established a consistent reading of 0.1 ppm or less. In this connection, it should be noted that no effort was made to determine values of iron less than 0.1 ppm.

Table 3 gives a summary of what has taken place at this plant in order to forestall any difficulties that

might have resulted from an excessive iron content in the system caused by carbon dioxide.

Table 3 is an indication of the progress that has been made. Not indicated in the table is the fact that, while the unit was being treated with about 500 milliliters of Amine per day at the start of the treatment, ammonia content at the deaerator discharge was about .025 ppm. After the treatment was reduced to 100 milliliters per day to maintain pH control the ammonia was reduced to traces. It is noted that the ammonia was lower, even when feeding large amounts of Amine, than it had been previous to the acid regenerated zeolite's operation. In this connection, we would like to point out that tests were also conducted on the after-condenser drains of the main

(Continued on page 82)

Liquid Rheostat for Induced Draft Fan Motors

INDUCED draft fans often require variable speed drives in order to secure the best operating results. If motor driven, the speed variation generally is obtained by one of three methods:

- 1—Hydraulic coupling.
- 2—Magnetic coupling.
- 3—Wound rotor motor.

The wound rotor motor has not been used to any great extent however, because until recently an unsatisfactory control system has been necessary. The development of the

By J. K. OSTRANDER

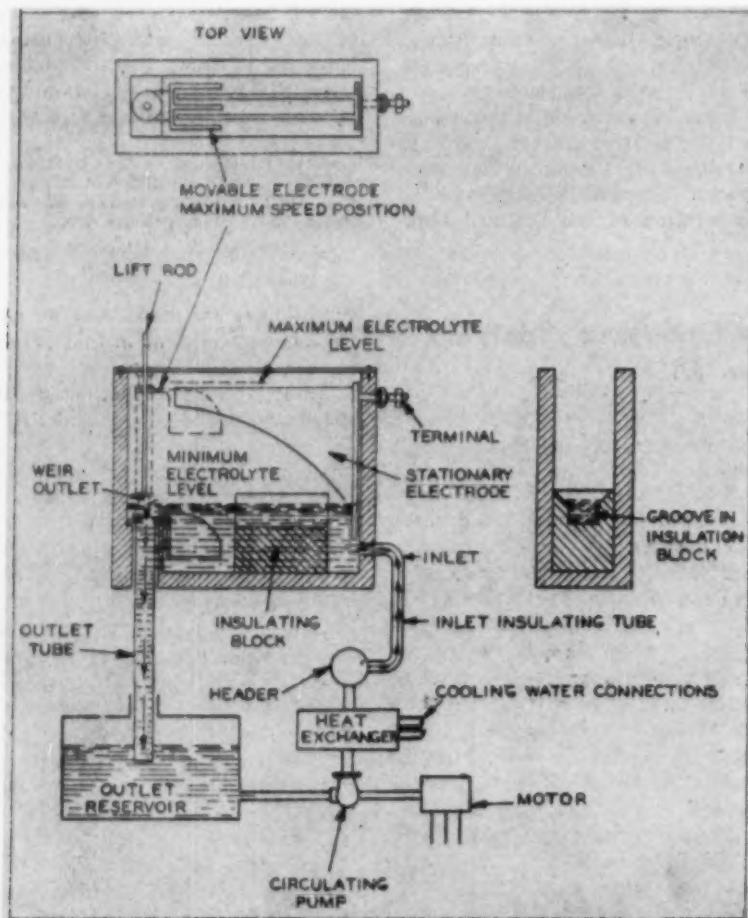
Consulting Electrical Engineer
United Engineers & Constructors, Inc.

liquid rheostat has altered this situation.

The three systems referred to above give approximately the same operating results. In each case the reduction of speed from synchronism is accomplished by dissipating heat approximately equal in value

to the energy supplied to the motor multiplied by the per cent slip. Therefore, the only difference in efficiency of the three systems is that which is caused by other comparatively small losses.

The desirable features of hydraulic and magnetic couplings are quite well known. But because only a few liquid rheostats for induced draft fan operation are now in service, the many advantages of this system of speed control are not generally known.



This rugged, uncomplicated speed control should greatly extend the use of the wound rotor motor for dependable variable speed service.

Fig. 1. The basic principle employed is to obtain a large change in resistance by making a small change in the position of a specially constructed electrode continuously submerged in a small quantity of electrolyte. This diagram shows a device for producing such a result.

Fig. 2. The speed of a 600 hp induced draft fan is controlled by this liquid rheostat. The rheostat, one of four duplicate units supplied by Allis-Chalmers, was recently installed at Delaware Power & Light Company's Edge Moor Station. The movable electrodes are positioned by a small electric motor which is mounted at the rear of the unit above the cells. The large tank under the cells is the outlet reservoir. The electrolyte circulating pump and heat exchanger (lower left) continually carry off the heat generated in the three cells.

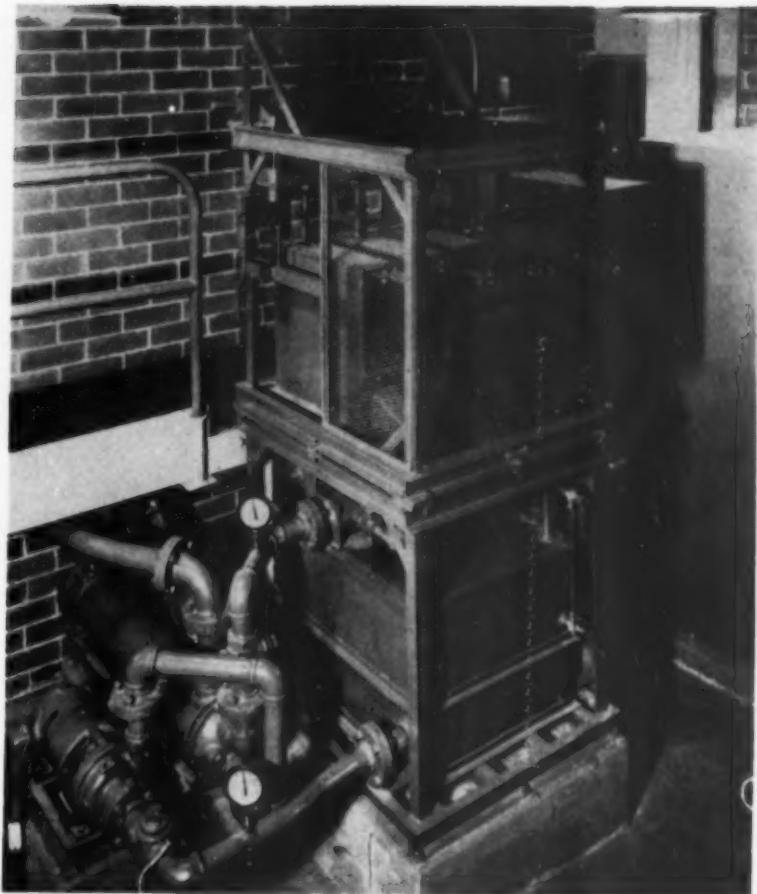
Each of the three systems require a means for disposal of the lost heat. If the motors are large this heat is carried away by a water cooling system using a heat exchanger.

The slip ring motor requires no extra machine to produce the necessary speed change. Therefore, if a simple reliable device can be provided for varying the motor secondary resistance, the advantages of this system are apparent. Such a device has been perfected and is operating satisfactorily at various localities.

The basic principle employed is to obtain a large change in resistance by making a small change in the position of a specially constructed electrode continuously submerged in a small quantity of electrolyte.

The device for producing such a result is shown in Figure 1. Its small size may be realized from the fact that the inside dimensions of each of the three electrolyte cells of a rheostat controlling a 600 hp motor is only $5\frac{1}{2}$ in. by $22\frac{3}{4}$ in. by $21\frac{3}{8}$ in. high. The complete rheostat for this size motor is approximately 38 in. wide, 46 in. deep and 100 in. high including the operator.

Varying the resistance is accomplished by raising or lowering the movable electrode which is attached to a weir constructed so as



to keep the electrode always submerged. The travel of the electrode for the total speed range is only 10 in. and each inch of travel produces approximately 10 per cent of the total speed change.

Figure 2 shows a rheostat with its auxiliary equipment controlling a 600 hp induced-draft-fan motor.

A feature of the slip ring motor drive which sometimes is of considerable value is the fact that no intermediate machine is required between motor and fan. Thus the over-all length of the drive is reduced and floor space saved. The liquid rheostat may be located at any convenient place and at considerable distance from the motor if desired.

One of the prime requirements of a boiler fan drive is that it shall never be necessary to take the boiler out of service on account of fan drive failure. The induction motor operating at usual fan speeds is a very reliable piece of

electrical equipment but the speed control equipment regardless of type may require occasional outage for inspection and repair.

If it becomes necessary or desirable to take the liquid rheostat out of service, this may be done by bringing the motor up to top speed and then closing a knife switch, short-circuiting the secondary leads from the motor.

Such a switch may be located in an enlarged terminal box, but in the case of the four 600 hp rheostats referred to above, four contactors mounted in a separate cubical serve as shorting switches.

The contactors also connect secondary circuits to ground when the contactor is in the closed position. This makes it possible to work on the rheostat while the motor is in operation without hazard or inconvenience. No difficulty has been experienced in opening the switch when the rheostat is to be restored to service.

Texas Power and Light Company Reports on Gas Turbine-Generator Operation

THE recently completed Dixon Street Generating Station of the Texas Power & Light Company at Gainesville, Texas, is the answer to a specific need that had developed in an area served by a radial line of a transmission system. Gainesville is situated in North Central Texas which is vulnerable to severe and frequent ice storms. Since it was necessary to assure Gainesville continued electric power service in the event of a crippling ice storm, the Dixon Street power plant was built there. This plant consists of a 1000 kw gas diesel engine and a 3500 kw General Electric regenerative gas turbine driving a 5000 kva generator.

The selection of the gas turbine unit and the 1000 kw dual fuel unit for the Gainesville Dixon Street Generating Station was based on

By **H. C. DAVIS**, Chief Mechanical Engineer, Texas Power and Light Company
and

R. L. JACKSON, Engineer—Gas Turbine Department, General Electric Company

an exhaustive economic study in which steam units, and various types and sizes of internal combustion units were considered. These studies included and compared fixed charges on investments, operating costs, maintenance, reliability, availability, starting time, and other factors.

We had had much experience in all of these factors with steam and other internal combustion units, whereas the values used in these studies for the gas turbine were of a necessity based on more theoretical estimates. However, now that

the station is completed and in operation, we find that the investment is astoundingly close to our estimate, that the fuel consumption of the unit is below that expected, and that other costs and factors are falling close in line with our estimate.

The gas turbine went into service in May 1952 and has operated some 1100 hours, being used almost daily in peaking service as needed. This installation, with a thermal efficiency of better than 23 per cent, based on the higher heating value of natural gas, is competitive with the installed steam plants from a

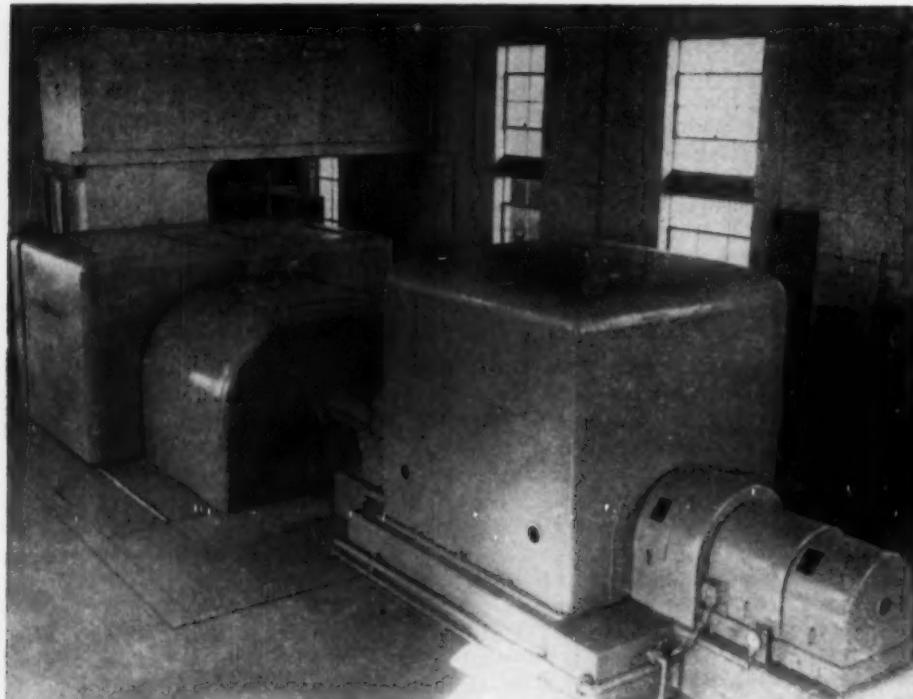


Fig. 1. View of 3500-kw regenerative-cycle gas turbine in Dixon Street station of Texas Power and Light Company.

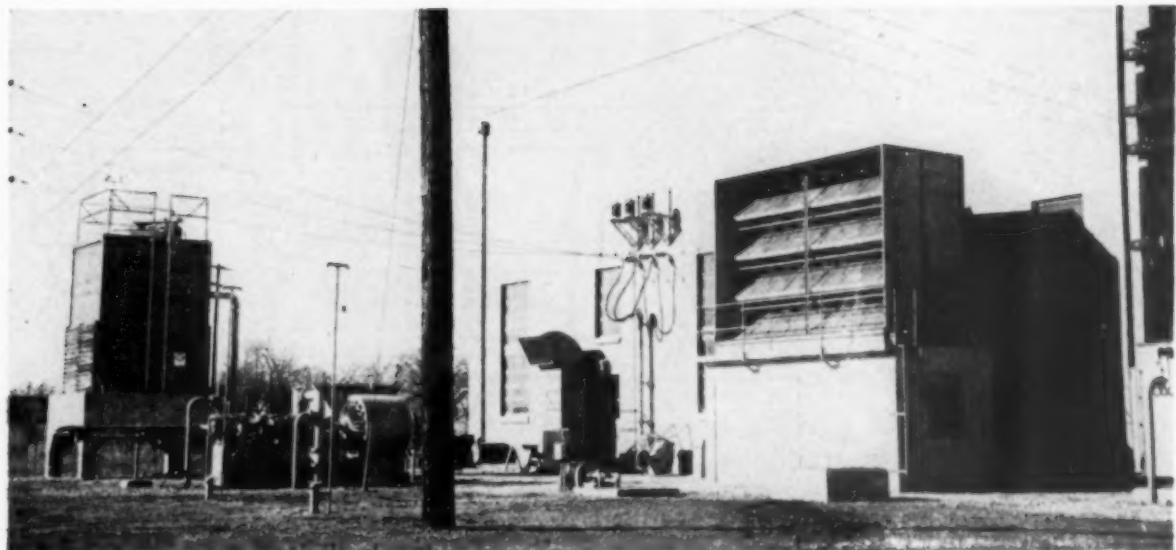


Fig. 2. External view of Dixon Street Station of Texas Power and Light Company, showing gas turbine cooling tower, fuel gas compressor, and turbine inlet evaporative cooler.

system capacity standpoint. Both machines in the plant can be quickly started in case of transmission line failure, but it has been the practice to run the gas turbine when ice storms are expected.

Arrangement of Equipment

The gas turbine and the diesel are arranged side by side in a brick building (50 x 75 ft) which results in ample room around each machine for accessibility and servicing. The gas turbine is served by an overhead crane of 15 tons capacity, with the crane rails parallel to the length of the machine. Figure 3 is a layout of the building showing the location of the gas turbine.

The gas turbine and its associated equipment occupies about one-half of the building. The gas turbine, generator, and regenerator are all mounted in line. The regenerator is outside the building wall. All of the hot gas piping between the regenerator and the gas turbine is arranged under the foundation and under the operating floor.

The oil tank is installed under the inlet end of the compressor between the gas turbine and the regenerator. The top of the oil tank is flush with the operating floor and forms a mounting for the oil coolers, and auxiliary and emergency lube oil

Material has been adapted from a paper presented at the recent American Power Conference.

pumps. The starting assembly is separately mounted over the oil tank top.

The control cabinet, containing starters for all the auxiliary motors, is mounted alongside the machine in the upper left corner of the layout. The duplex panel, which contains the gas turbine control circuits and the generator panel, is mounted alongside the gas turbine at the generator end as seen in the upper right corner. Also mounted alongside the turbine and adjacent to the building wall are the cooling water pumps and the turbine cooling water tank and heat exchanger.

The inlet to the gas turbine is an overhead rectangular duct which runs to the air washer at the side of the building as can be seen in Figure 1.

Figure 2 is a view of the station yard showing the gas turbine cooling tower, the fuel gas compressor, and the evaporative cooler to the turbine inlet.

Figure 4 is an elevation outline of the gas turbine showing the general arrangement of the machine components, the combustion air piping and the regenerator. The gas turbine is supported on a concrete foundation which consists of concrete beams supported on pillars which span the pit in which are located the exhaust duct and the hot gas piping to and from the regenerator.

The operating floor, as shown in Figure 4, is 3 ft below the center line of the rotating machine elements. The base of the regenerator is approximately 14 ft below the operating floor line. The piping and ducting between the turbine and the regenerator is so arranged with expansion joints and hangers that no expansion loads or gas pressure forces, which might cause misalignment, are exerted on the machine.

Gas Compressor

The fuel gas compressor receives natural gas at the supply pressure of 25 to 40 psig and compresses it to 160 psig which is required by the gas turbine fuel system. The compressor is a rotary, horizontal, two-stage machine manufactured by the Fuller Company. It is driven by a 200-hp electric motor and will deliver 1090 standard cubic feet per minute at 25 psig suction pressure.

Cooling Tower

The cooling tower, manufactured by the Marley Company, dissipates the heat rejected by the turbine lube oil system and the turbine cooling water system. It has a cooling range of 105 F to 95 F at 78 F wet bulb for a 500 gpm capacity. The tower is set on a square concrete base which is elevated about five feet above grade, as can be seen in Figure 2, and has a capacity of approximately 1200 gallons. The

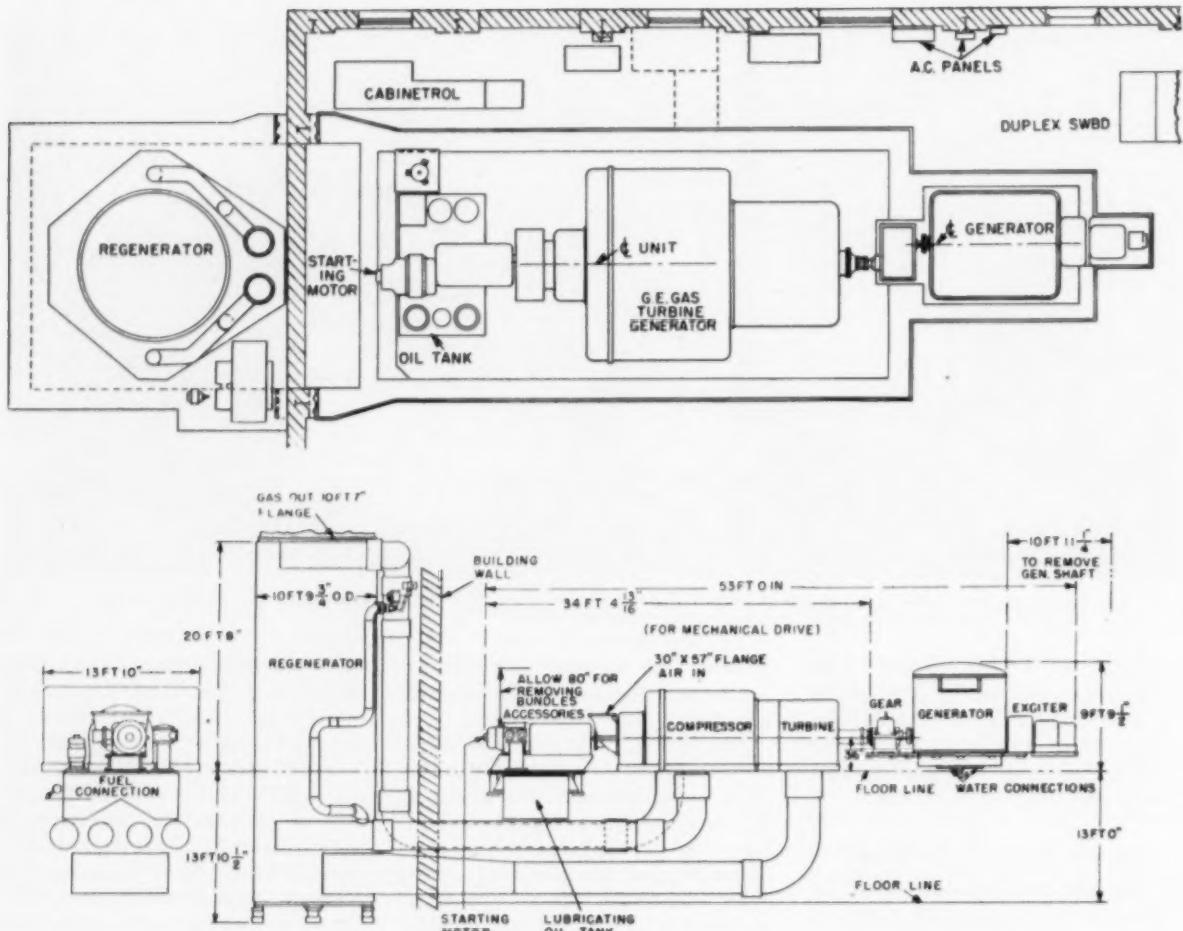


Fig. 3. The upper drawing shows the arrangement of equipment in the Dixon Street Generating Station.

Fig. 4. The lower drawing is an outline of the 3500-kw regenerative-cycle gas turbine showing dimensions of the installation.

cooling tower fan is driven by a 5-hp motor through a "V" belt drive.

Air Washer

The air washer or evaporative cooler was manufactured by the Buffalo Forge Company. It is equipped with wet-cell glass filters, an internal water spray system, and spray eliminator plates. The air washer cools and humidifies the air used by the gas turbine. The evaporative cooling feature of the inlet air results in about a 20 degree drop in inlet air temperature when the dry bulb is at 100 F and the wet bulb at 78 F. The increase in power output resulting from the 20 degree temperature drop is about 450 kilowatts. This increase is obtained at an installed cost of ap-

proximately \$20 per kilowatt.

Regenerator

The regenerator is vertical and of the shell and tube type construction with counterflow of the gases. Compressor discharge air enters the top of the regenerator and flows outside the tubes to the bottom where it is piped to the combustion chambers on the gas turbine. The turbine exhaust gases are ducted to the bottom of the regenerator below the tube sheet, through the tubes, and out the stack mounted on the regenerator. The heat exchanger contains 5100 tubes, 1 1/4 in. in diameter and 28 ft long, for a total surface area of 46,000 sq ft. The regenerator weighs 125 tons. Its design effectiveness is 80 per cent, and its pressure drop, gas side

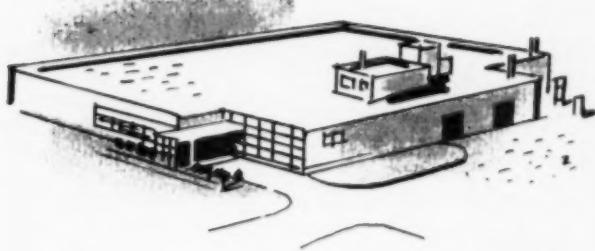
plus air side, is 5 per cent of the absolute pressure.

Gas Turbine

The turbine is a two shaft machine with a load or low-pressure turbine mounted in the same casing but completely separate from the high-pressure turbine which drives only the 14-stage axial-flow compressor.

Inlet air comes into the compressor at the inlet of the machine on the left hand side of the diagram. The air is compressed to a pressure ratio of 5.5 to 1 and is ducted from the discharge casing to the regenerator. Hot high-pressure air then comes back to the machine to the vertical combustion air manifolds from which it enters the six combustion chambers.

IT PAYS TO HAVE DEPENDABLE WATER SERVICE

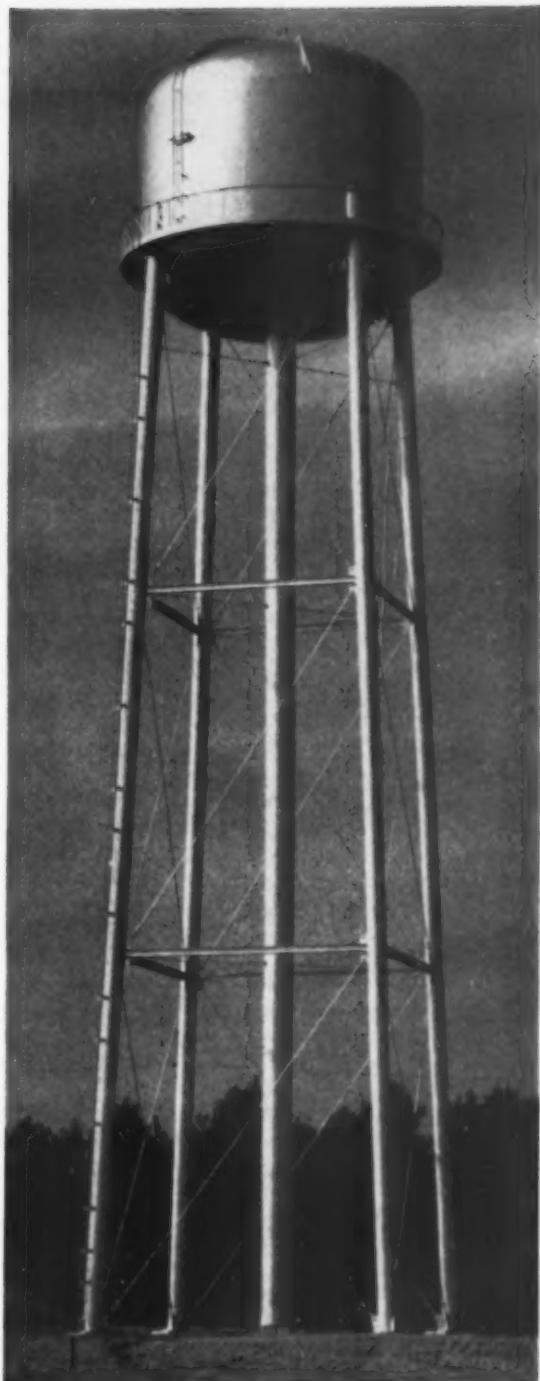


HORTON ELEVATED TANK SERVES POINSETT LUMBER and MANUFACTURING CO.

A fire protection system is only as dependable as its water supply. For that reason, the Poinsett Lumber and Manufacturing Company installed a 100,000-gallon Horton elevated tank to assure a dependable water supply at all times for the automatic sprinkler system at its new Anderson, S. C., plant. The automatic sprinkler system was installed by the Daniel Construction Company of Greenville, S. C.

The gravity water supply, together with an automatic sprinkler system, provides the kind of fire protection that pays off in property saved and reduced insurance premiums. When fire breaks out, water flows from the tank the moment the first sprinkler head opens and quenches the flames before they have a chance to gain headway.

Horton ellipsoidal-bottom elevated tanks are built in standard capacities from 15,000 to 500,000 gallons. For larger installations, we build radial-cone bottom elevated tanks in standard capacities from 500,000 to 3,000,000 gallons. Please write our nearest office for further information estimates or quotations. There is no obligation on your part.



100,000-gallon Horton elevated tank providing water for fire protection at the Poinsett Lumber and Manufacturing Company's plant in Anderson, S. C.

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Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

Detroit 26.....1534 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17.....1545 General Petroleum Bldg.
New York 6.....3312-165 Broadway Bldg.

Philadelphia 3.....1644-1700 Walnut St. Bldg.
Pittsburgh 19.....3252 Alcos Bldg.
San Francisco 4.....1531-200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1428 Hunt Bldg.

In Canada—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

Fuel is injected and burned in the combustion chambers; then, the hot gas passes through the high-pressure nozzle and turbine. The gases leaving the high-pressure turbine flow along the axial gas path into the low-pressure turbine which drives the load. Then the gases pass out through the exhaust hood, the exhaust duct, and through the regenerator to atmosphere.

The nozzles ahead of the low-pressure turbine are variable in area. This feature will limit overspeeds in case of loss of load, result in better heat rate at partial load, increase the machine power capability at high ambient temperatures, reduce starting power required, and facilitate running at no load while synchronizing.

The gas turbine itself has been more completely described in a paper entitled "Design Features of a 5000-HP Gas Turbine" published in "Transactions" of the ASME dated July 1952.

Operating Experience

Some difficulties have been experienced with the gas turbine since it was installed. The variable-angle turbine nozzles showed some tendency to stick, although they did not actually stick in service. Reworking of the parts involved eliminating the binding tendency.

A blow-off valve was added to the high-pressure side of the regenerator in order to limit the load turbine and generator overspeed to a safe value if high load were to be dropped and the second-stage nozzles did not open fully.

There have been several points of oil leakage from the machine which will be fixed by replacement of some bearing seals during an overhaul.

The regenerator has given some evidence of distress at the lower tube sheet, and it is planned to install an expansion joint in the regenerator shell during the forthcoming overhaul in order to reduce the stresses resulting from the severe differential expansion between the tubes and the shell during operation.

Starting, stopping, and operating the gas turbine is relatively simple, and can be easily accomplished by one man. On starting, the auxiliaries are manually started by op-

erating the individual starters in the control cabinet. Then, the machine can be brought to any one of five conditions when the starting button is pushed depending on the position of the operation selector switch. The positions on the switch are: Off, Crank, Fire, Speed Control, and Automatic. With the selector on Automatic, speed and load are controlled from the generator panel, while on Speed Control, these functions are controlled from the gas turbine panel.

The starting sequence is automatically controlled up to the selected condition. The machine is cranked, purged, fired, accelerated and brought to speed on the governor when the selector switch is in either the *Speed Control* or *Automatic* position. The starting motor is shut down and declutched from the turbine shaft and the auxiliary oil pump is shut down automatically in the starting sequence. After being brought to speed, the machine is synchronized and put on the line.

During operation, the governor controls fuel to hold the set speed and load, but with an overriding exhaust temperature limit which will limit fuel to prevent exceeding the set exhaust temperature. In addition to the normal control, there are overspeed trips in each turbine shaft and an exhaust temperature

trip which is set somewhat above the normal exhaust temperature limit. Low lube oil pressure, high lube oil temperature, or high turbine cooling water temperature will also trip the machine off the line.

Personnel

The plant operates on a stand-by basis; therefore, a minimum operating force is required. It is also required to have someone on duty at the plant 24 hours a day, seven days a week, to handle radio dispatching of the distribution, maintenance, and service personnel.

To accomplish this, a five-man crew was established consisting of a chief engineer to act as general supervisor of the plant crew, handling the necessary records and correspondence as well as the operating details of the plant; three regular-shift operators; and a relief operator to maintain the 24-hour requirements for the seven day week. Each operator puts in one extra eight hour day per month to complete the schedule.

The gas turbine installed at the Dixon Street Station has met the expectations of the company. As installed, it is an economical power plant, can be quickly started, and requires a minimum of operating personnel. It is a firm power source on the TP&L system.

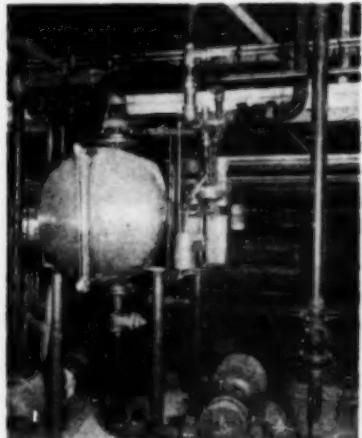
Wrought Iron Pipe

245 Tons for Corrosive Surfaces in G.E.'s Louisville, Ky., Plant

One of two batteries of condensate pumps being installed in each of five similar buildings is shown in this progress photo of current construction at General Electric Appliance Park, a new manufacturing development being built near Louisville, Ky., at an approximate cost of \$100,000,000.

To protect against damage from possible corrosive elements in steam condensate, wrought iron pipe has been installed for the return lines within each building and to the area's central boiler plant.

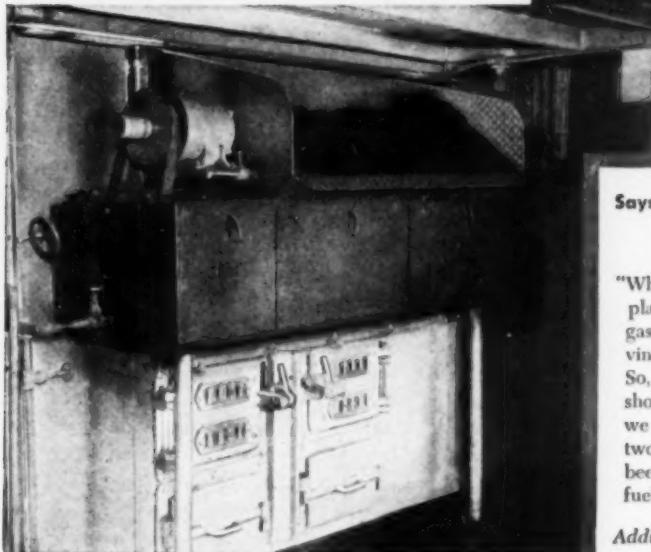
For this and other possible corrosive services, almost 245 tons of wrought iron pipe, ranging in size from $\frac{3}{4}$ -in.



to 12 in. has been utilized in the initial phase of General Electric's huge construction program.

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*An air view of the
Metcalfe Wholesale Florist Greenhouse.*

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Metcalfe Wholesale Florist
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Additional case histories, showing how other types of plants have saved money by burning coal the modern way, are available upon request.

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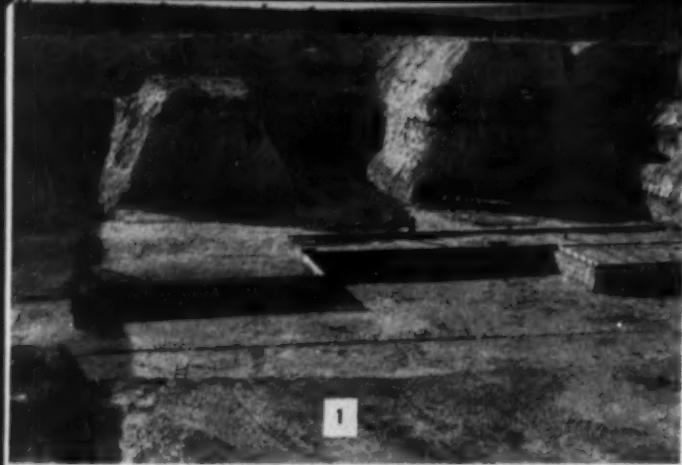
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Soil Analysis Saves \$150,000

Monck's Corner, South Carolina

THE NEW Pinopolis Steam Electric Generating Station at Monck's Corner, South Carolina, designed by Ford, Bacon & Davis, has a foundation that is costing over half a million dollars, yet by thorough soil analysis, the Daniel Construction Company of Greenville, South Carolina and Birmingham, Alabama, saved the South Carolina Public Service Authority more than \$158,000.00 under the next lowest bidder.

Conventional procedure would have been to use sheet steel piling and a complete well point system to keep water out. The bottom of excavation was 14 ft below water level and the foundation was within 20 ft of the canal.

Careful analysis indicated that this heavy Carolina marl soil strata would form an efficient wall if the foundations could be gotten in quickly. Handled in this manner, no water problems were encountered.

Fig. 1. The bottom of the excavation as the first forms are being set. Despite the fact that there had been rain, the water in the bottom was easily controlled by the two pumps pictured.

Fig. 2. The first layer of reinforcing in place and the forming for the cooling water tunnels nearly completed. Note that the very bottom of the concrete has already been cast.

Fig. 3. The next layer of the foundation being cast. The Pumpcrete machine is placing concrete in the lower center, and the intermediate layers of steel are being placed in the background. The concrete is now nearly all cast around the water tunnel forms.

Fig. 4. A close-up of the heavy steel reinforcing. These 1½ in. steel reinforcing bars are set on 3 in. centers providing greater foundation strength for the \$14,000,000.00 power plant being erected above the foundation.

Fig. 5. Details of the reinforcing around the cooling water tunnels. Work at this level is still considerably below the water surface, yet because of the careful soil analysis work, no water problems were encountered.

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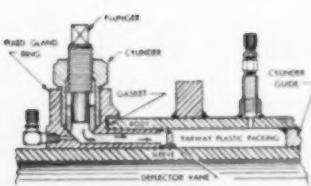
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twist a wrench, and the joint is tight, the job is done.

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Cross-section
of Gun-Pakt
feature.

YARWAY

**gun-pakt
expansion joints**

"Q & A" for the Man-in-the-Plant

Electrical Equipment Fundamentals

By A. T. LOHKAMP, Superintendent of Power Plant,
Pasco Packing Co., Dade City, Florida

Q—What are overloads?

A—If a motor is required to drive a heavier load than it was intended to, or a generator is required to furnish more than its rated current, it will heat up excessively and may be seriously injured. This condition is known as "overload." Most machines will stand nearly twice normal loads for a few seconds, and some are designed to carry a given overload for a given period of time; but as a rule loading an electrical machine beyond its capacity is likely to damage it seriously.

The rated load for which a machine is designed is called its "full load" and is commonly designated as 100 per cent load. Overloads are given in percentage above this. For example, a 100 hp motor that is carrying 112 hp has a load of 112 per cent or 12 per cent overload. Likewise fractional loads are expressed in per cent. At half rated load a motor is said to be operating at 50 per cent load.

Q—What is meant by efficiency?

A—All electrical machinery heats up in operation because of the losses in the windings, cores and other machine parts. This heating is all a loss of energy as far as the electrical machine is concerned, and enough power must be put into the machine to supply these losses in addition to the power required by the load on the machine. It is evident that more power must be put into a machine than can be taken out of it.

Efficiency is the ratio of the power output to the power input, and is usually expressed in per

Part 6—Technical and Design Data

This is the sixth of a series of 7 "Q & A" articles presented to help plant men become more intimately acquainted with the electrical equipment in their charge. A thorough understanding of the points covered will improve operation and maintenance, and help employees advance to higher positions.

Installments of this Series Include:

Part 1—Operation and Maintenance	Jan. '53
Part 2—Distribution and Controls	Feb. '53
Part 3—Synchronous Motors	Mar. '53
Part 4—Three Phase Induction Motors	Apr. '53
Part 5—Single Phase Motors	June '53
Part 6—Technical and Design Data	This Issue
Part 7—Selecting Generators and Motors	Aug. '53

cent. The ideal machine would be 100 per cent efficient, but this is not possible. Efficiencies for general purpose motors and generator range from 70 to 95 per cent, depending on the type, size and speed. The efficiency increases with the size of machine. The efficiency also varies with the load on the machine. Most machines are designed to have highest efficiency at full load.

Q—What are the advantages of ball bearings?

A—Numerous advantages are obtained by the use of ball bearing motors. Years of severe service are built into the bearings; proven by almost imperceptible and evenly distributed wear on bearings which have been used on heavy belt drives over long periods of time. Maintenance is reduced to a minimum as the bearing lubricant requires replace-

ment only once a year under average service conditions of eight hours per day. Clean motors and surroundings result from grease tight bearing inclosures. Likewise no oil can be centrifugally thrown by the rotor into the stator windings, causing rapid deterioration of the insulation.

A uniform air gap between the rotor and stator is assured with this type of bearing, thus giving sustained high operating efficiency throughout the life of the motor. Replacement or undercutting of the shaft is eliminated as any wear on ball bearings takes place on the inner and outer race and not on the shaft. Expensive shut-

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"Q & A" for the Man-in-the-Plant (continued)

downs due to bearing failures are reduced to a minimum as ball bearings do not burn out and seize the shaft. Advance warning of bearing wear is usually noticeable, so that replacements can be made when the machine can be conveniently out of service.

Q—Can alternating current be changed to direct current?

A—Yes, it is easily and very commonly done. Most electrical systems supply alternating current, because such current is more economically generated, transmitted and distributed to power users scattered over wide areas than is direct current. When direct current is desired from an alternating current system it is derived therefrom by means of converting or rectifying equipment.

Q—How can alternating current be changed to direct current?

A—When a rotating machine is used to change a-c to d-c the machine is called a "converter." There are two principal kinds used in this country: synchronous converters and motor-generators. Both of these machines are used for large currents.

When other apparatus is used in place of rotating machinery it is usually called a "rectifier." Rectifiers are of several types, including the electrolytic, mercury arc, gas-filled and vacuum tube types. Rectifiers permit current flow in only one direction—like a check valve; in fact, they are often called electric "valves." With the exception of the mercury arc type they are used only for small currents.

Q—What is a synchronous converter?

A—It is a machine similar to a direct current generator with a commutator at one end of the armature, but also equipped with a set of slip rings at the other end connected into the armature winding. If driven by a prime mover the machine can supply both direct current at its commutator, and alternating current at its slip

rings; it is then called a "double current generator." As a converter it is driven by a-c power and changes alternating current to direct current with higher efficiency than any other means, but it always maintains a fixed ratio between the voltages of these currents. It is not as flexible as a motor generator and requires more skilled operation. Synchronous converters are much used in the substations of electric railways and central station companies.

Q—Can the frequency of an alternating current be changed?

A—The frequency of an alternating current can be changed by means of a motor generator set often called a "frequency changer" or "frequency converter." This set consists of an alternating current motor, built to run on current of one frequency, and driving an alternating current generator which will produce a voltage of the desired frequency.

Q—What is meant by the word "proof" when used as a suffix in describing a motor?

A—Motors are described as splash-proof, dust-proof, etc., when they are so constructed, protected or treated that successful operation is not interfered with when subjected to the specified material or condition.

Q—What is meant by the word "resisting" when used as a suffix in describing a motor?

A—Motors are said to be moisture-resisting, fume-resisting, etc., when so constructed, protected, or treated that they will not be readily injured when subjected to the specified material.

Q—What is a splash-proof motor?

A—A splash-proof motor is one so constructed and protected that external splashing with water will not interfere with its successful operation.

Q—What are the pull-in and pull-out torques of a motor?

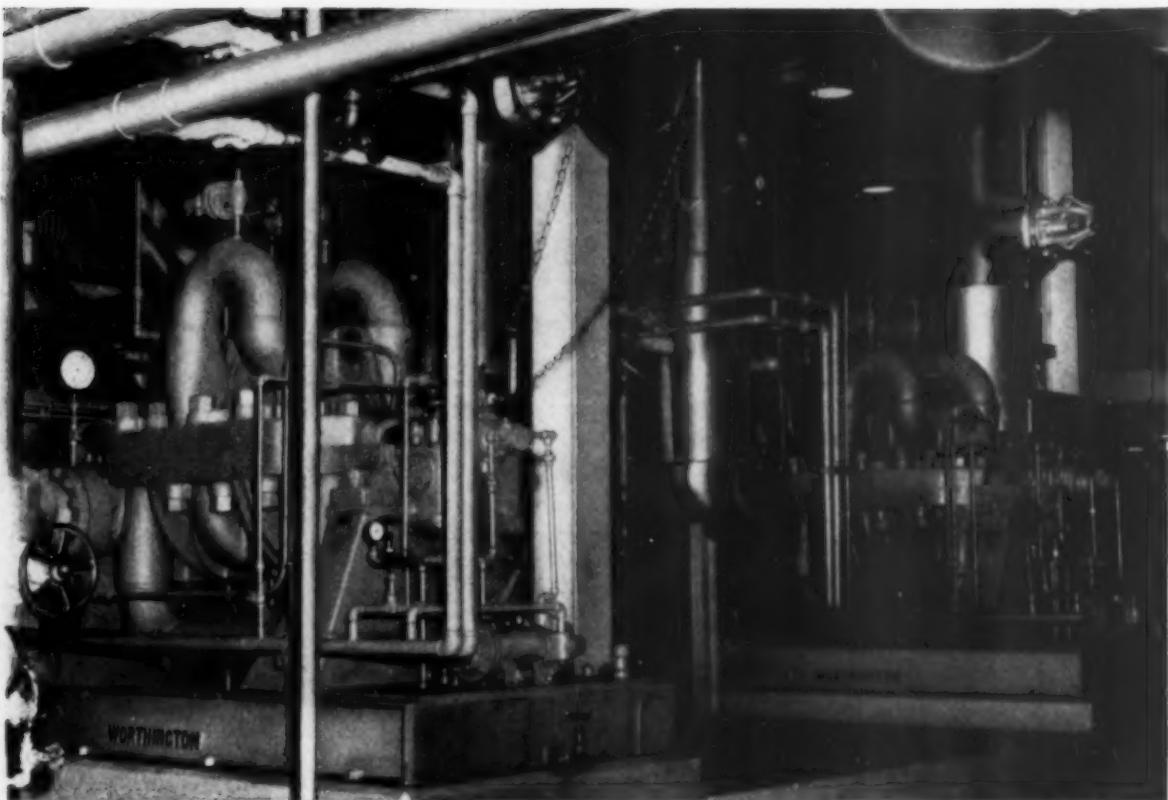
A—These terms apply almost exclusively to alternating current motors. Several types of these motors are started as one type and then changed over to the normal running type when near full speed. The torque they exert at the moment of change is the "pull-in torque." For example, the instant when the repulsion start induction motor changes from repulsion to induction is its pull-in point, and its torque at that moment is its pull-in torque; or when a synchronous motor pulls into step with the revolving magnetic field.

Most alternating current motors have a definite maximum load point beyond which they rapidly lose speed and stop. This is commonly called the "pull-out" or "breakdown" or "maximum running" torque. Both the pull-in and pull-out torques, as well as the starting torque, are commonly given in percentage of the full load or rated torque, which is taken as 100 per cent. Although the guaranteed breakdown torque ranges between 175 and 200 per cent of full load torque, in many motors it actually exceeds over 600 per cent by test, showing the guarantees to be very conservative.

Q—What is meant by the synchronous speed of a motor?

A—The term "synchronous speed" applies only to alternating current motors. It is the speed of rotation of the revolving field produced by the primary winding. The synchronous motor is the only one in which the synchronous speed is the same as the full load speed. The speed of the synchronous motor in revolutions per second equals the frequency of its power supply circuit divided by the number of pairs of poles of the motor. Synchronous speeds are more commonly stated in revolutions per minute.

With induction motors the synchronous speed is the speed at which they would run if there were no "slip." Their no-load speed is just a little below synchronous speed. The latter is almost invariably given as the rated no-load speed.



THIRTY WORTHINGTON BOILER FEED PUMPS have been purchased by the Southwestern Public Service Company of Amarillo, Texas. The two boiler feed pumps above, installed at Southwestern's new Plant X, deliver 1165 gpm, at 1125 psi total head.

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teners, sump pumps, air compressors, and the open feed-water heater.

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DIESEL GENERATOR

Heat Balance Problem Solved

FACED with the heat balance problem so common to power plants making steam for process and heating purposes, Howard University of Washington, D. C., has brought its system into balance with the installation of a new 862 kw Fairbanks-Morse diesel generator unit.

Designed to carry the major portion of the summertime electrical load, the diesel generator has been instrumental in reducing per-kilowatt costs by over 60 per cent in the light steam (summer) periods and by 7 per cent on a yearly basis.

The diesel is an 8-cylinder, opposed-piston engine of 8½ in. bore and 10 in. stroke developing its rated 1280 hp at 720 rpm.

The steam plant generates part of the power requirement and supplies heating and process steam to Howard University and to Freedmen's Hospital, located directly across the street from the power plant.

Plant operating procedure depends upon the size of the heating and process steam loads. During the winter months, steam generation is at a maximum with the diesel being used only to handle peak electrical loads not accompanied by corresponding increases in steam loads. The turbo-generators exhaust steam at 5 lb pressure for building and feedwater heating. Steam at 200 lb pressure is also reduced to 125 lb for use in plant auxiliary drives, hospital sterilization work and for boosting heating system pressure if necessary.

In the summer months, when heating loads are at a minimum, the diesel unit carries the base load and the maximum savings accrue from the use of diesel power. Although the cost per gallon of fuel oil increased 11.6 per cent soon after the

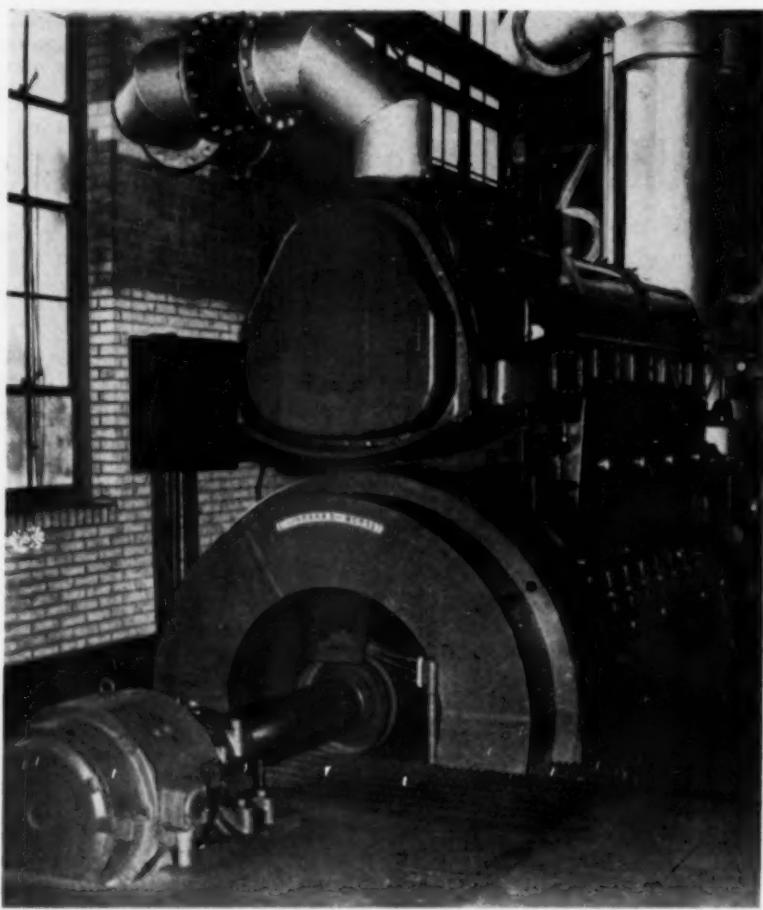
By V. HENRY WARRICK

Asst. Superintendent, Buildings & Grounds
Howard University, Washington, D. C.

diesel was installed, and net steam output increased 15.3 per cent and net power output was upped 4.7 per cent, these increases were accompanied by an actual reduction of 23.6 per cent in the gallons of fuel consumed and a reduction of 60.7 per cent in the cost per kwh.

Overall yearly savings are lower,

of course, on a percentage basis; but the unit cost for electricity is less, in spite of sharp increases in the price of diesel fuel. A steady increase in the total amount of diesel fuel consumed reflects the increasing use of this type of power generation even in periods of heavy steam demand. Often the diesel is used at extremely light loads and though this is not conducive to engine efficiency, it serves the overall purposes of plant balance and economy.



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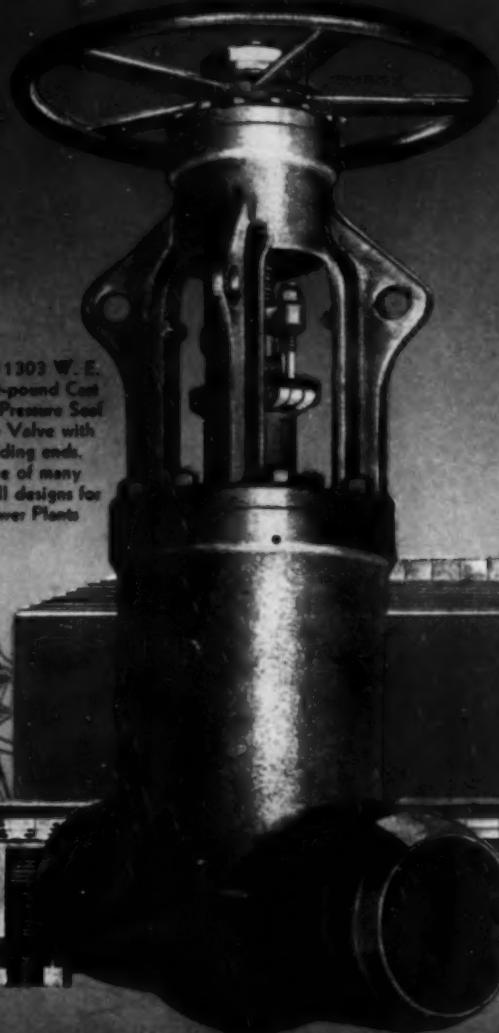


Fig. 11303 W.E.
1500-pound Cast
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To be trustworthy is one of the finest attributes of mankind. In flow control equipment it is essential.

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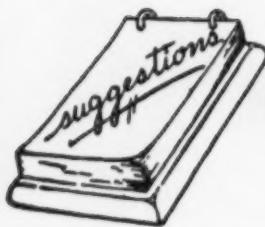
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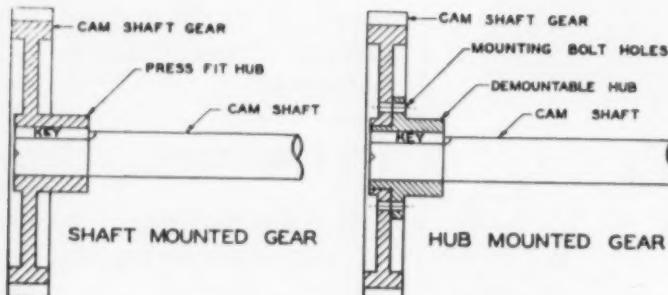
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HELPING the MAN-IN-THE-PLANT

ideas . . . tools . . . methods . . . devices



Demountable Hub for Large Spur Gears

ANY WELL equipped machine shop can repair or rebuild large gears when necessary. The foreman or his machinery repairmen can show you several excellent methods of removing the gear from its shaft and remounting it thereon for realignment after repairs. What about the production lost from the machine while this work is taking place? Any good maintenance supervisor will try to schedule his major repair work for periods when production will not be stopped, such as week-end days. But what about those uncooperative gears that fail during the week and must be attended to immediately? Must the machine stand while a new gear is installed? Must nearby machinery stand also, so that the mechanics can safely work on the damaged gear?

W. H. Leathers, Master Mechanic of the Patterson Mills Company, Roanoke Rapids, N. C., found just this problem facing him with the cam shaft gear on several hundred Draper X-2 looms installed in the plant. His solution to the problem not only applies to this loom but has innumerable other applications in punch presses, large pumps, crushers, riveters, metal breaks and other machinery where impact loads are transmitted through large gear trains.

The cam shaft drives many varied motions on the loom; cam actions, cloth roll-up motion, stop-motions, pick counters, and other functions. This means that the shaft is fitted with many cams, gears, and sprockets which must be precisely timed.

The cam shaft drive gear is pressed onto the shaft, thus requiring removal of the shaft from the loom for gear replacement. This job takes two men about six hours to complete while the loom stands idle and produces no cloth.

The cams apply an impact load at two points 180 degrees apart around the gear during each complete rotation. Thus wear on the gear is at a maximum on two or three teeth at the same two points around the gear at each revolution. The other teeth serve mostly for timing purposes.

After considerable usage, teeth at the impact points will wear excessively. Complete loss of a tooth, of course, means a gear replacement. Usually, however, alert mechanics will spot the worn gears before tooth failure occurs.

The worn tooth segment will not carry the impact load for long but will easily keep the gear train in time. However, with the gear keyed to the shaft there is no alternative but to change the gear

whether production is lost or not. Some rapid means of rotating the damaged tooth away from the impact point would allow the machine to resume production quickly and extend the life of the gear teeth.

Mr. Leathers designed the demountable hub arrangement shown in the sketch. The gear is no longer keyed to the shaft but is mounted on the hub by six equally spaced bolts. Thus the gear can be rapidly disconnected from the hub, rotated in steps of 60 degrees, and remounted to the hub for operation. One man can perform this change in 15 minutes. The worn teeth are removed from the impact point and the gear remains in use. Frequently, a gear can be rotated several times before a damaged tooth would again fall at the impact points.

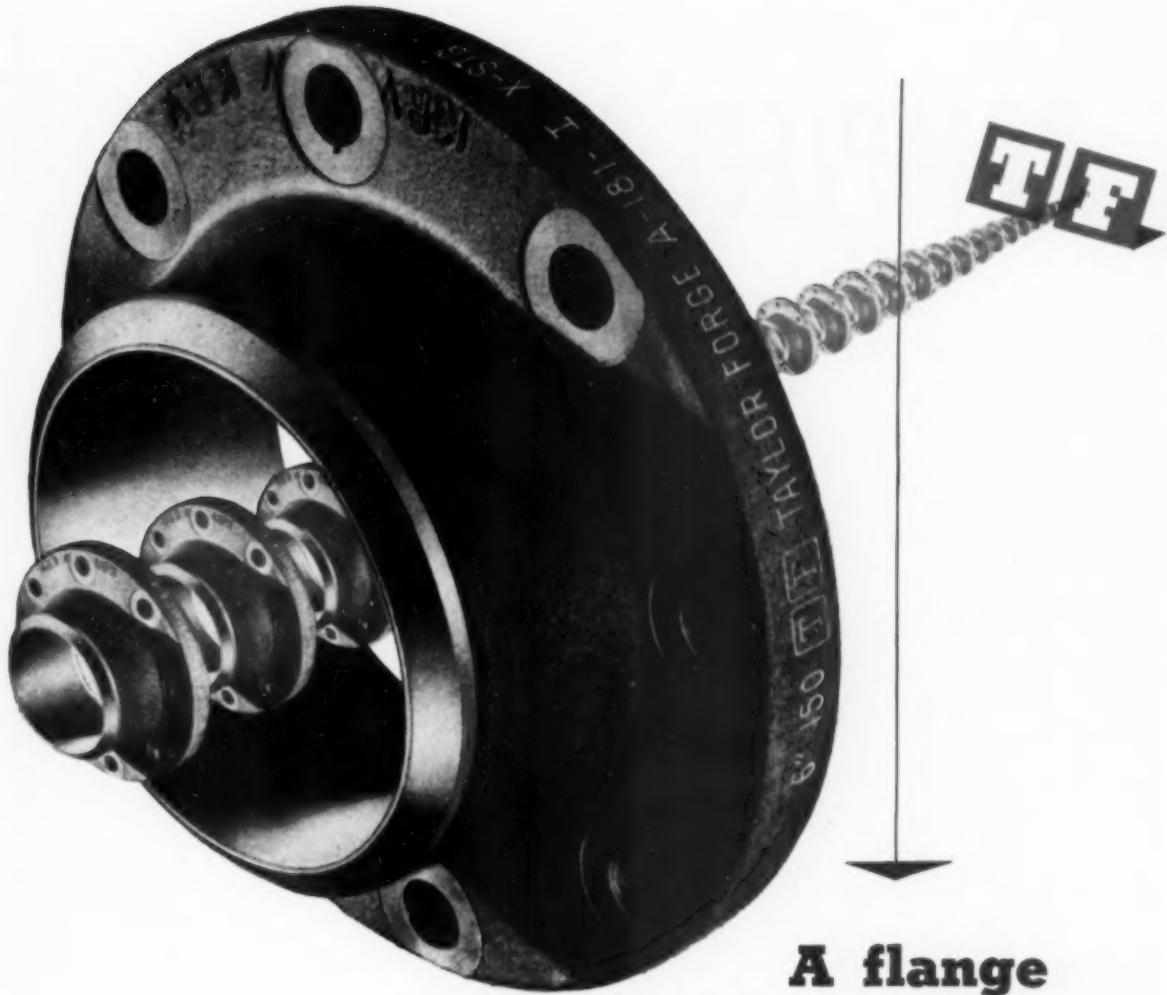
The demountable hub thus saves $5\frac{3}{4}$ hours of production and $11\frac{1}{2}$ man-hours of repair costs at each change of the gear. In case of a complete tooth rupture, a new gear can be installed with the same savings. Existing gears can be remachined to fit this hub. Gears worn too badly for a press fit on the shaft can be salvaged by fitting them on the hub mounting.

By Robert J. Tucker, Jr., Plant Engineer, Patterson Mills Company

\$\$\$ For Your Ideas

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.



A flange with a background . . .

*For up-to-the-minute facts
see your Taylor Forge Distributor*

You are looking at a flange with a history. Taylor Forge made the forged steel flange and in a sense the forged steel flange made Taylor Forge. It was Taylor Forge, back in 1905, who made the first forged steel flanges on a commercial scale . . . and it is Taylor Forge who has guided flange development across the past half century.

Through the first threaded flange form, the bolted Van Stone form, and the perfected welding neck form pictured here, Taylor Forge has undeniably contributed more to flange development than any other organization*.

Taylor Forge Welding Neck Flanges are a part of the WeldELL® line—the line that more than 20 years ago gave industry the first complete line of fittings for pipe welding. The organization that led development is still leading . . . in scope of types, sizes, weights, materials . . . in quality and downright value!

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Plants at: Carnegie, Pa., Fontana, Calif., Gary, Ind., Hamilton, Ont., Canada

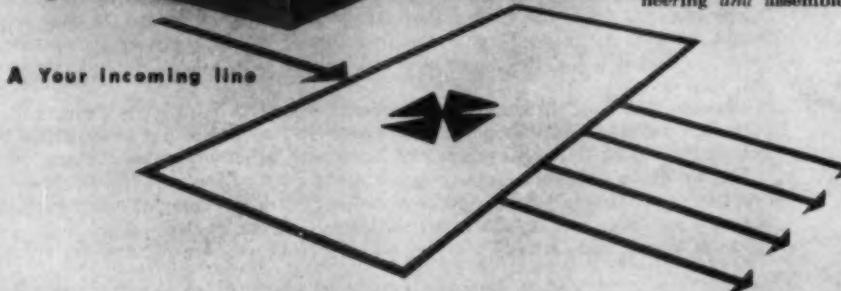
* When pressures rose from the old 150- and 300-pound standards to 400, 600 and finally 900 pounds, it was largely the exhaustive research of Taylor Forge that supplied the formulas for determining stresses in flanges for any given condition of loading. Among many examples: the Taylor-Waters formula, published in 1927, became and still is the

basis of recognized practice for flanges in sizes through 24". Again, in 1938 Taylor Forge published the first edition of the now authoritative "Modern Flange Design" based on methods proposed by E. O. Waters, D. B. Rosseim, D. B. Westrom and F. S. G. Williams, Taylor Forge Manager of Engineering Standards. (ASME Trans., Apr. 1937)

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Modern plants require the utmost in power distribution efficiency, reliable circuit protection, service continuity, safety, and economy.

Unit Substations—integrated units of stepdown transformers and protective switchgear for location at load centers—have been an I-T-E specialty for many years.

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From the incoming lines to the outgoing circuits, I-T-E supplies all the equipment you need—completely coordinated as a package. Furthermore, I-T-E assumes full responsibility—from initial planning, through manufacture, to shipment. Factory-assembled and -tested, *complete* unit substations are delivered ready for installation.

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UNIT SUBSTATIONS

for every application

helping the man-in-the-plant (continued)

Amines—Central Louisiana Electric

(Starts on page 50)

condenser air-evacuating equipment although not as frequently as those in other parts of the system. After approximately 3 months of operation the ammonia content of the after-condenser drains varied from traces to .025 ppm, the iron content 0.1 ppm with a pH of 7.0-7.2.

It was expected that iron in the boiler water would not respond as rapidly and this was found to be true. However, definite decrease of iron here has been experienced and at this writing has stabilized at something less than 1.0 ppm.

As a result of this treatment, an interesting development is the fact that it is no longer necessary to clean the glass electrodes in use for pH measurement. Heretofore, it was necessary to clean them weekly due to an accumulation of deposits.

We are greatly encouraged by the results of this program and immediately following the comple-

tion of annual inspection of all boilers this type of treatment will be started on all the units of this plant. We are particularly interested in the results that will be obtained when using the Amine on our No. 4 Unit which operates at the next higher pressure and temperature; i.e. 850 psi, 900 F. It is quite possible that we would never have encountered any difficulty with corrosion by operating the plant as it was initially started but we do feel that we did have a quite serious problem before the installation of the acid-regenerated zeolite softener. By also resorting to Amines to eliminate any possible carbon dioxide in the system and employing it for a definite pH control we now feel quite confident that the corrosion of our entire power plant steam-water system will be at the practical minimum that can be provided with presently known methods once it is intro-

duced to all units in the plant.

What has made this so attractive is that costs are insignificant. It is estimated that the entire plant could be treated for less than \$10.00 per month.

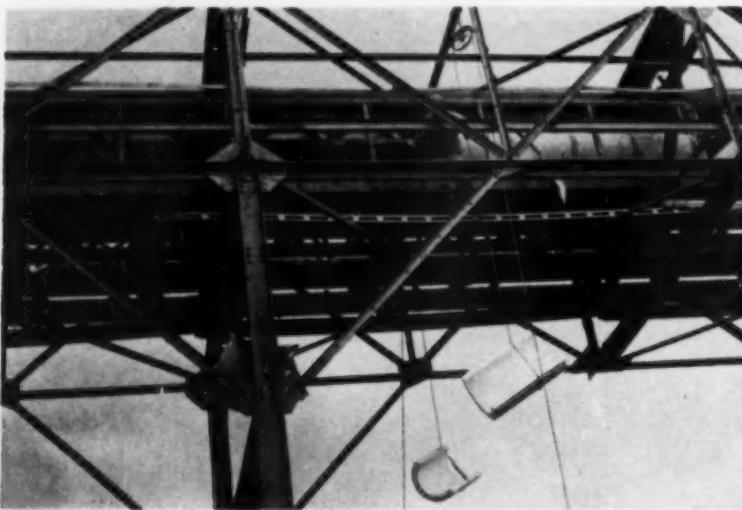
We will in the next few months place in operation a 20,000 kw unit operating with steam conditions of 850 psig, 900 F at a new plant in South Louisiana to be known as Teche Station. Rather than use evaporators at this station with the potential carbon dioxide that was present in the water we anticipated using for evaporator feed, we have made provisions for demineralization of make-up. This demineralizing plant is to be a completely automatic one furnished by the Permutit Co. However, if conditions prove that pH control is necessary we will resort to Amines for this purpose.

We hope that the data contained in this discussion will be particularly encouraging and helpful to operators of small, moderate pressure power stations and assist them in deciding what they should do about corrosion of the steam and water systems in their plants.

Piping and Equipment Insulation Methods at General Electric's Louisville Plant

PROPERLY applied and maintained thermal insulation is helping the General Electric Com-

pany reduce the operating expenses of "Appliance Park," located on a 1000-acre tract near Louisville,



Kentucky. Five major production buildings, warehouses, and service buildings together are capable of producing some six thousand electric ranges, dishwashers, food waste disposers, home laundry equipment, hot water heaters and refrigerators each working day.

Both heating and process steam needed by these buildings is generated in a central boiler house by 150,000 lb/hr Riley boilers. At peak production the boiler plant will consume 625 cars of coal per month. Since up to 10 per cent of the fuel's heating value could be lost through *uninsulated* steam transmission piping and equipment, the savings made possible by the application of 85% Magnesia are considerable. In fact, these heat savings are enough to pay for the insulation within a few years.

At "Appliance Park," 85% Mag-

85% Magnesia is being hoisted for application to 20 in. steam line and 12 in. condensate trestle piping between boiler house and manufacturing building.

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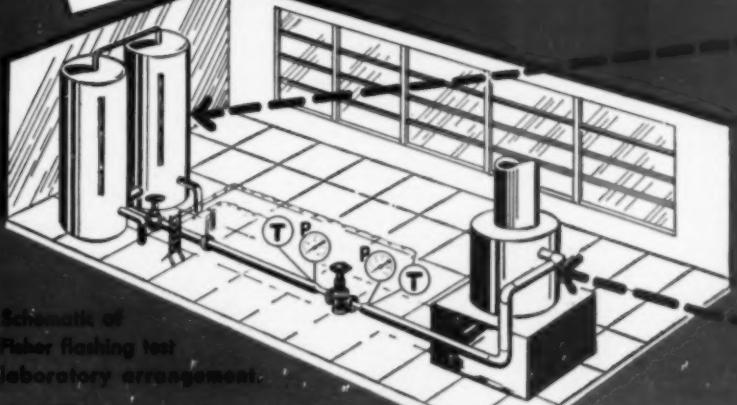
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helping the man-in-the-plant (continued)

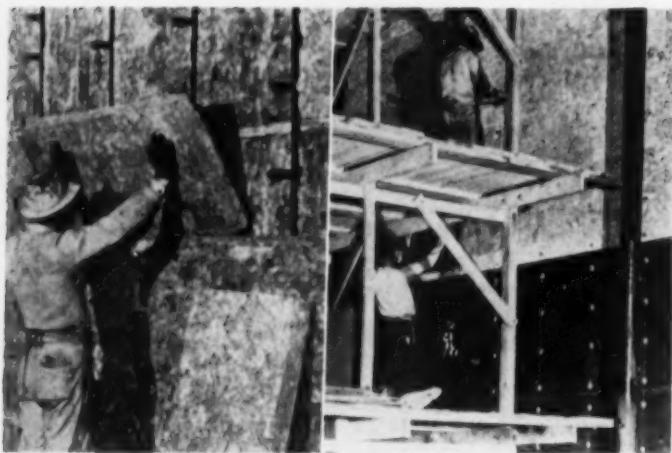
nesia in appropriate thicknesses has been applied to condensate receivers and pumps, other boiler-room auxiliaries, and pressure reducing stations. So that the block insulation would not slip or sag

away from the vessels, Nelson studs were welded onto the equipment to which the insulation was securely fastened. Hexagonal wire mesh was then stretched taut over the insulation and $\frac{1}{4}$ in. layers of asbestos

insulating and asbestos hard finish cement were troweled on. The vessels were finished with a pasted jacket of 8 oz canvas.

High- and medium-pressure steam mains, condensate, and domestic hot water lines were also insulated with 85% Magnesia. Two-inch layers were applied to all but the hot water lines which were insulated with a 1 in. layer. Outdoor lines were carefully weatherproofed with both a factory-applied 35 lb roofing felt jacket and a 50 lb asphalt saturated roofing felt jacket applied on the job. In addition these outdoor lines were insulated with thicker 85% Magnesia to cut heat losses to a minimum. Up to 3 in. thicknesses were applied on the high-pressure mains which are up to 20 in. in diameter. Sheet metal jackets were applied at expansion joints to protect the insulation against mechanical damage.

Depending on size, fittings and valves were insulated with block insulation and/or asbestos insulating cement. In either case the total thickness applied was the same as that on the adjacent piping. To facilitate ready access to flange bolts in maintenance work, removable insulation was applied to most flanges.



Large sheets of Fiberglas insulation, 4 in. thick, are being applied at the left to a wall of Freezer Company's new cold storage warehouse in Leesburg, Florida. Two layers of the insulation are in the walls of the structure. The Stik-Clip method, utilizing knife-like clips was used for installing the second layer of insulation. The Fiberglas insulation was impaled on the clips and then covered with perforated tempered hard board, $\frac{1}{8}$ in. thick (right). This "dry" application method eliminates use of hot asphalt and attendant on-the-job hazards.

A glass-lined deep freeze unit, large enough to cover two football fields, is perhaps the best way to describe the new cold storage warehouse recently completed by the FREEZER COMPANY in LEESBURG, FLORIDA.

This warehouse will be operated under a long term lease by the Minute Maid Corporation, a major producer of fresh frozen concentrated orange juice.

Utilizing up-to-date construction methods and 1,235,000 board feet of Owens-Corning Fiberglas insulations in its walls and roof, the 2,600,000 cu ft warehouse is one of the largest in Florida and one of the biggest and most modern in the country.

Nearly 500,000 sq ft of Fiberglas insulation is incorporated in the new warehouse which consists of three rooms, each 200 by 170 ft.

To help maintain temperatures of 10 degrees (Fahrenheit) below zero, the building is virtually wrapped in

Fiberglas insulation. In the walls, for example, two layers of Fiberglas insulation provide an 8 in. thick barrier between the sub-zero interior and the warm outside air.

Partition walls have 3 in. thick insulation on each side. The 100,000 sq ft roof contains 8 in. thick insulation on top of the roof slab. This was applied with hot asphalt adhesive, which also was used to apply insulation on walls below floor level.

Fiberglas insulation was chosen because it will not burn, rot, mildew or absorb moisture and provides the thermal insulating qualities necessary for efficient operation of cold storage facilities of the type found in the Freezer Company structure.

General construction contractor for the building was the Leesburg Freezer Company. Standard Insulation Company, Fort Lauderdale, was insulation contractor, and the refrigeration system was installed by Worthington Corporation.

Leakage Detector

IN hydrostatic pressure tests of piping or tanks, considerable difficulty is encountered in warm humid weather. If the temperature of the test water is below atmospheric temperature, condensation will form on the outside of the pipe or tank.

A slow leak is not readily distinguishable from this condensation or "sweating." It is often impractical to heat the test water.

We overcame this difficulty by adding Fluorescein (obtainable at chemical supply houses) to the test water—about one ounce per hundred gallons of water. We then inspected for leaks in semi-darkness, using a 250 watt GE "Purple-X" (Black Light) globe. Each leak glowed vividly, and was easily located.—Herman Hart, Texas Boiler & Machinery Co., Dallas, Texas.

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For heating water, oil and other liquids. Wide variety of types and sizes for portable or permanent installations, with or without built-in thermostats.



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Straight lengths or tailored to any desired shape. For heating liquids, solids or gases by conduction, convection or radiation. Many sheath types.

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Chromalox Electric Heaters give you quick, on-the-spot heat for a wide range of uses. They provide dependable, efficient, economical around-the-clock service in applications requiring continuous, accurately controlled temperatures. Thousands of plants in all industries have found Chromalox Heaters the low cost solution for heating liquids and gases; for heating dies, platens, moving parts; for super-heating steam and pre-heating oil; in fact—for almost every industrial application using heat.

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SOUTHERN POWER & INDUSTRY for JULY, 1953

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Over 130 field engineers in 36 key cities give on-the-job assistance and counsel.

IC-74

NEWS for the South and Southwest

G.E. Co. Vice Pres.—Texas

GEORGE L. IRVINE of Schenectady, N. Y., has been elected a commercial vice president of the GENERAL ELECTRIC COMPANY with headquarters in DALLAS, TEXAS.

Mr. Irvine succeeds WILLIAM B. CLAYTON, of Dallas, who is retiring from the company after almost 48 years of service. Mr. Clayton has served as commercial vice president in Dallas since 1942.

Mr. Irvine, who will be engaged in customer relation activities in his new capacity, formerly was manager of agency and distributor sales for the company's Apparatus Sales Division at Schenectady.

He was graduated from Iowa State College in 1930 and joined G.E. the same year as a student engineer. He



George Irvine

held positions in both the commercial and industrial division before becoming manager of the Apparatus Agency Sales Division in 1941. In 1949 he was appointed manager of agency and distributor sales for the Apparatus Sales Division.

Mr. Clayton spent his early life in New York and then moved to Clayton, Alabama, where he was graduated from Alabama Polytechnic Institute in 1905 at the age of 17.

Mr. Clayton then joined General Electric as a student engineer. Several years later he was transferred to the Commercial Department and subsequently to Dallas. He was later made transformer specialist and placed in charge of the sale of various types of apparatus as supply manager.

When the company's Southwestern District was formed in 1924, he was made district manager of the Central Station Department. He later became assistant district manager and in 1939, was appointed district manager. He was elected a commercial vice president in 1942.

Metalworking Trends

in the Southeast

A reminder of how fast the South is growing up industrially comes from WYSONG AND MILES COMPANY of Greensboro, N. C.

Wysong has completed and delivered what is believed to be the largest machine tool ever made in the Southern states—the pilot model of its 3/16-in. by 12 ft capacity power squaring shear. It weighs more than 10 tons.

The Wysong shear was delivered to CAROLINA STEEL AND IRON COMPANY, also a Greensboro firm. Carolina Steel is a long-established business which has grown in recent years until it ranks one of the largest independent fabricators of steel in the South. Until comparatively recently, a few machine tool makers concentrated near the automotive and aircraft industries were Carolina Steel's only source of shears.

Wysong itself is a long-established business by most any standard, but its production of machine tools and metalworking machinery dates rough-



This 3/16-in. x 12 ft capacity power shear was fabricated by Wysong and Miles Company, Greensboro, N. C., for Carolina Steel and Iron Company. Russell F. Hall, Jr., president of Wysong, and T. P. Noe of Carolina Steel are shown with the machine tool.

ly from the beginning of the South's astounding new industrial growth.

Founded in 1903, it made nothing but woodworking machinery until World War II. During the war it filled a number of metalworking machinery and metal products contracts for the government, including bomb fuses and drill cartridges. After the war, it continued to make metalworking machines on an increasingly larger scale. Today, the company turns

out nine pieces of metalworking machinery for every one of woodworking.

The Wysong shear has a 10 hp, high-torque, high-slip motor. Standard equipment includes front operated precision back gauge and individual feet with compensating springs in hold-down to permit accurate shearing of various thicknesses in one operation. Hold-down is mechanically operated and provides 4 tons pressure. Gears, clutch and eccentrics run in a constant bath of oil.

Have you a fly ash recovery problem?

Bring it to
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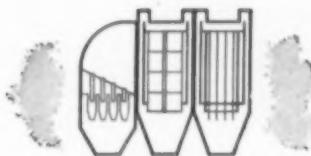
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Of "Know-How" In BOTH Electrical
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If you have any kind of a suspension-recovery problem—whether dust, fly ash, fume, fog or mists—it will pay you to bring it to the leading organization in the field . . . **WESTERN PRECIPITATION CORPORATION**. Western Precipitation not only pioneered, over 44 years ago, the first commercial application of the now-famous **COTTRELL** Electrical Precipitators, but also has been a leader for many years in the mechanical recovery field with its widely-accepted **MULTICLONE** Collectors.

Result:

Western Precipitation is unsurpassed in the all-important factor of "know-how" in BOTH the electrical and mechanical fields . . . knows from years of first-hand experience whether your particular problem can best be solved by mechanical or electrical methods—or by a combination of the two . . . can give you a direct and unbiased recommendation on the matter . . . and then can provide the complete installation under one responsibility, one overall performance guarantee, even where Combination Multiclon-Precipitator (CMP) installations are made!

Western Precipitation products and services include . . .



COTTRELL

Electrical Precipitators

... the most efficient recovery equipment for high recovery, long life, low maintenance on practically any type of suspensions, wet or dry. COTTRELLS can be designed to handle a few c.f.m. — or millions—with equal ease, and at virtually any operating temperature. Recovery efficiencies closely approach 100% recovery, if desired, with very low draft loss, minimum power costs and negligible labor costs. *By all standards, Western Precipitation COTTRELLS give highest recovery at lowest cost per-year-of-service!*

MULTICLONE

Mechanical Collectors

... the most efficient, most compact, most trouble-free mechanical equipment for recovering suspensions from gases. Because of their unique small-tube design, MULTICLONES are unsurpassed in mechanical recovery efficiencies—require less space, less maintenance, and are far simpler to install. No filters or screens to replace, nothing to burn or cause fire hazards, no high speed moving parts to repair or replace. These and many other advantages make MULTICLONE Collectors the logical choice on installations where mechanical recovery is selected.

CMP UNITS

(Combination Multiclon-Precipitator)

... combine, in one compact installation, both mechanical and electrical recovery principles so that maximum benefit is obtained from the advantages inherent in each method. The MULTICLONE section centrifugally removes the larger and heavier suspensions (down to a few microns in diameter) . . . and the COTTRELL section then electrically removes the very small particles remaining in the gases. Thus, the bulk of the recovery is obtained with relatively low-cost equipment, and the final clean-up is obtained with equipment having unusually high recovery efficiency—approaching theoretically perfect, if desired.

The recovery of suspensions from gases is a highly exact science and every problem is different. Some require mechanical methods—others electrical methods—still others a combination of mechanical and electrical methods in proper balance to meet the individual requirements of each application. No matter what your problem, remember that only Western Precipitation has had years of field experience in BOTH mechanical and electrical methods!

Let our experienced engineers study your recovery requirements and make an unbiased recommendation on the equipment best suited to your particular problem. A wire, phone call or letter to our nearest office places this unique "know-how" at your service, without obligation.

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MULTICLONE—T.M. Reg.

news for the South and Southwest (continued)

Minneapolis-Honeywell—N. M.

PAUL FEGER has been assigned to the Albuquerque industrial sales engineering staff of MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, it was announced recently.

Feeger, who transferred from the firm's Denver office, will specialize in the sales and service of products of the company's Industrial and Valve Divisions. Feeger recently concluded an extensive training session in the company school in Philadelphia, Pa. His headquarters will be at 623 Yale Boulevard, S.E., ALBUQUERQUE, N. M.

Pioneer Pump—W. Va., Ala.

Appointment of exclusive representatives to handle sales and engineering service of the complete line of Pioneer and Rollway centrifugal and positive displacement pumps has been announced by THE PIONEER PUMP DIVISION, Detroit Harvester Company, Detroit, Michigan.

VIRGINIAN ELECTRIC, INC., of CHARLESTON, WEST VIRGINIA, will be the exclusive representative in West Virginia and the adjoining counties of Virginia, Ohio and Kentucky.

SHOP SUPPLY COMPANY, 2412 Sec-

ond Avenue, BIRMINGHAM, ALABAMA, will be the exclusive representative in Alabama, Georgia and Tennessee.

Bay State Abrasive Products

ELDEN L. AUKER of Detroit, former big league baseball star, has been appointed sales manager for BAY STATE ABRASIVE PRODUCTS COMPANY, 15 Union St., Westboro, Mass.

Mr. Auken succeeds E. HALSEY BRISTER, who has been named director of product development and quality control, a new post.

Florida Power Company \$33-million Expansion

This year's scheduled \$33-million expansion of electrical power facilities at the FLORIDA POWER AND LIGHT COMPANY reflects the increasing industrial activity and growing population of the state, a company report released recently reveals.

The addition of an 80,000 kw unit for the firm's Riviera steam-electric station in West Palm Beach is expected to help meet the growing demand of the state's manufacturing firms, currently totaling some 5,100 organizations. Included in the expansion program will be a cross-state transmission line connecting the east coast with the lower west coast to permit an interchange of power between the two areas.

The expansion at Riviera Beach, augmenting the existing 50,000 kw capacity, calls for a two-unit station under supervision of an automatic monitoring system. Developed in collaboration with engineers from Minneapolis-Honeywell's Industrial Division and Ebasco Services, the system will include instruments to observe, control, evaluate and regulate various operating factors. Basically, the system comprises electronic (null balance servo type) indicating, recording and signalling instruments. The vital operating conditions monitored by the instruments include: electrical conductivity of condensate; saturated steam and evaporator vapor; temperatures of turbine exhausts; turbine and general bearings; oil; critical points in the stator of each generator; air from exciter, main transformer and hydrogen coolant. Sensing elements for these measurements will be installed at the point of measurement and wired to a centrally located instrument. Some of the instruments record as many as 16 different temperature measurements from as many points and signal, via annunciation contacts, any variation.

The new plant in Atlanta is the latest of the network of well-equipped manufacturing plants in the Southeastern District located in nine Southern cities. The plants located in Charlotte, N. C.; Birmingham, Ala.; Baton Rouge, La., and Picher Street, Atlanta, are primarily for servicing Westinghouse customers on repair work. The other plants are located at Hampton, S. C.; Raleigh, N. C., Montevallo, Ala.; Reform, Ala., and Vicksburg, Miss., and they manufacture new products. The new plant in Atlanta will also manufacture new products.



Manufacturing & Repair Plant for Westinghouse—Atlanta

A new plant for the manufacture and repair of a variety of electrical equipment used by industry in the Southeast, principally power transformers, control and switchgear, will be built in ATLANTA by the WESTINGHOUSE ELECTRIC CORPORATION.

Otis O. Rae, Manager of the Southeastern District for Westinghouse, said the modern steel and brick building is expected to be ready for occupancy early in 1954. It will be located on a 17-acre site at the corner of Chattahoochee and Ellsworth Avenues.

Construction of this new plant, which represents the first phase of what will eventually be a multi-million dollar expansion, was dictated by the firm's recognition of industrial potentialities in the Southeast and by industrial growth already characterized by increased use of electric power.

The new building in Atlanta will provide facilities that will enable Westinghouse to coordinate and bring under one roof certain office and factory personnel who are currently working in separate locations.

Plans for the next few years call for a doubling in the size of the new plant with provision for even further expansion later. Ultimately the en-

The new manufacturing plant of Westinghouse Electric Corporation, to be built in Atlanta, is to be completed early in 1954.

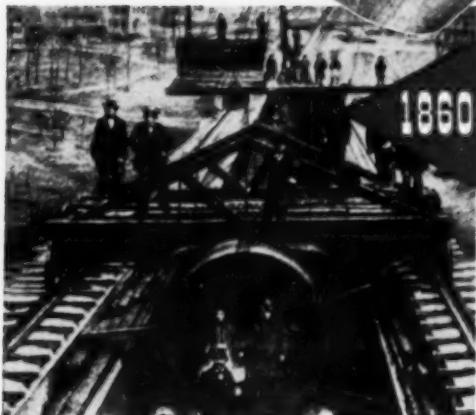
tire 17-acre plot will be occupied with office and factory facilities.

Equipment to be manufactured includes various types of power transformers, switchgear and control devices which will be used in various phases of Southern industrial activity, but especially in the textile, chemical and paper industries.

Mr. Rae reports that current company manufacturing and repair business in the Southeastern District has increased approximately 10 times in the past 10 years, and that the outlook for the future calls for a constant increase of production facilities.

The new plant in Atlanta is the latest of the network of well-equipped manufacturing plants in the Southeastern District located in nine Southern cities. The plants located in Charlotte, N. C.; Birmingham, Ala.; Baton Rouge, La., and Picher Street, Atlanta, are primarily for servicing Westinghouse customers on repair work. The other plants are located at Hampton, S. C.; Raleigh, N. C., Montevallo, Ala.; Reform, Ala., and Vicksburg, Miss., and they manufacture new products. The new plant in Atlanta will also manufacture new products.

Here's why GENUINE WROUGHT IRON



1860

The Croton Aqueduct pipe line laying in 1860. This line, designed to carry water to the island of Manhattan, is made of $\frac{1}{2}$ -inch genuine wrought iron plate.



1951

The Croton Aqueduct after more than 90 years of flawless service. A recent inspection of the line revealed that it was in excellent condition.

LAST

makes INSTALLATIONS

Remarkable genuine wrought iron performance records similar to the Croton Aqueduct installation are recorded for a wide variety of services in practically every industry. The secret behind this material's ability to extend its "life-span" in corrosive services is illustrated in the notch-fracture test specimen pictured above.

This notch-fracture shows the unique fibrous structure of genuine wrought iron. Tiny threads of glass-like silicate slag, 200,000 to 250,000 per square inch of section, are distributed through the body of high-purity iron. These slag fibers are unaffected by corrosion, and set up mechanical barriers that halt and disperse corrosive attack, discourage pitting and rapid penetration. The fibers also anchor the

initial protective scale, which shields the underlying metal.

Genuine wrought iron's service records from the past are providing an increasing number of the nation's leading engineers and designers with a reliable guide for material selection today. We will welcome the opportunity to review your corrosion problems with you—and to recommend the places where genuine wrought iron—on the basis of past experience—can be used to help cut maintenance costs.

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Division: New York, N. Y.

*Send for
this
booklet
Today*



Interesting case studies of genuine wrought iron installations from the past are presented pictorially in this new, non-technical booklet, "Proof by Performance." There's a copy waiting for you.

BYERS

CORROSION COSTS YOU MORE THAN WROUGHT IRON
WROUGHT IRON
TUBULAR AND HOT ROLLED PRODUCTS
ELECTRIC FURNACE QUALITY ALLOY AND STAINLESS STEEL PRODUCTS

news for the South and Southwest (continued)

Black & Decker Addition

Ground has been broken to begin the actual construction of a \$2,000,000 addition to THE BLACK & DECKER MFG. CO.'S HAMPSTEAD, MD., branch plant.

The 126,800 sq ft addition, which will double the size of the present Hampstead branch plant, is scheduled to be completed by November; but partial operations will commence as early as September. The Austin Company of Cleveland designed the new addition and is in charge of construction.

Present plans do not include moving any major department from the Towson plant. The additional space is needed for the various operations already located at Hampstead. These include punch press, sheet metal, forging, field and stator winding, and large tool assembly.

Reynolds—Midland, Texas

REYNOLDS METALS COMPANY, 2500 South Third St., LOUISVILLE, KENTUCKY, has announced opening of a new sales office at 305 Central Building, MIDLAND, TEXAS, to better serve the oil and gas industries.

ANDREW R. DAVIS, JR., is in charge of the new office. Mr. Davis was born in Bellaire, Texas, and comes to Midland from the Reynolds sales office in Albuquerque, N. M.

Potomac Edison Promotions

THE POTOMAC EDISON COMPANY, Hagerstown, Md., has announced promotions affecting S. S. BRADFORD and C. D. LYON of the Company's Commercial Department and CHARLES MORRISON of the Operating Department.

Mr. Bradford was named to the post of General Commercial Manager of

the Potomac Edison System. Prior to his new appointment he had been serving as Promotional Manager.

Mr. Lyon, formerly Advertising and Publicity Manager, has been designated Promotional Manager succeeding Mr. Bradford.

Mr. Morrison, who has been serving as Relay Engineer, has been named to fill the newly created post of Planning Engineer for Potomac Edison's Operating Department.

Barber-Greene—Ala., Fla.

BARBER-GREENE COMPANY, Aurora, Ill., has announced the appointment of HARRY G. MOUNT CO., 544 American Life Bldg., BIRMINGHAM, ALA., to represent its belt conveyor line to industrial accounts in Alabama and in six western Florida counties.

Mississippi Chemical Corp. Enlarges Ammonia Plant

THE MISSISSIPPI CHEMICAL CORPORATION, YAZOO CITY, MISS., is increasing the capacity of its ammonia plant from 120 to 180 tons per day. The new construction will entail an investment in excess of \$2,000,000. Work on the project is expected to be completed late in 1953. THE GIRDLER CORPORATION, LOUISVILLE, KY., is the prime contractor.

Girdler also constructed the Mississippi Chemical Corporation's original ammonia plant and other facilities, which went on stream in 1951. Cost of the original project was about \$9,000,000.

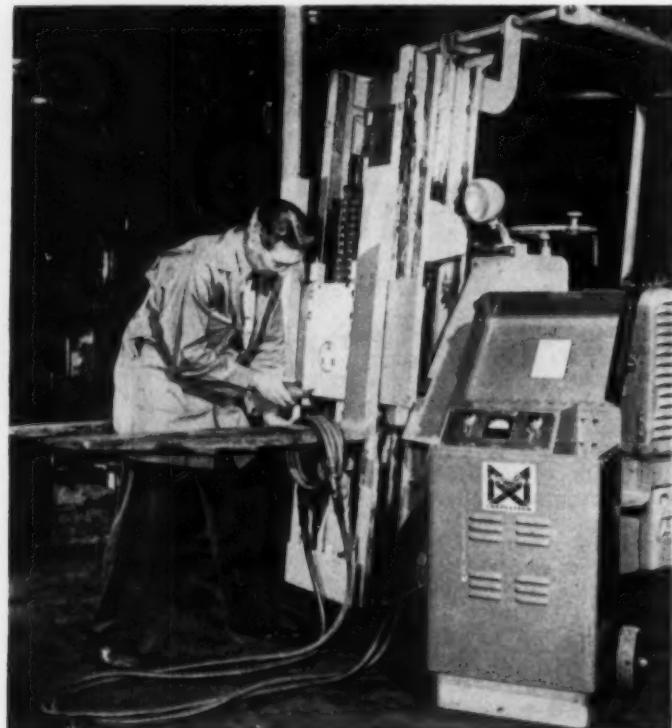
Green River Steel—Ky., Expands Sales Staff

WILLIAM H. MEYER, as metallurgical sales engineer, and VINCENT BURGER, as sales representative, have joined the staff of GREEN RIVER STEEL CORPORATION, OWENSBORO, KENTUCKY.

Mr. Meyer was formerly chief metallurgist at Brad Foote Gear Works and Hurley Machine Company in Cicero, Illinois, and field metallurgist with Copperweld Steel Company, Warren, Ohio.

Mr. Burger was formerly sales engineer for Mid-West Material, Inc., and sales manager for Amalgamated Steel Corporation in Cleveland.

Production emphasis at Green River Steel is quality killed carbon steels and alloy steels of all analyses, including aircraft, gun, armor-piercing shot and bearing quality steels, and stainless and heat-resisting steels. Company has two electric furnaces, each with a rated capacity of 50 tons.



Portable Unit for Maintenance Inspection

An on the job photo showing important preventive maintenance inspection of the fork member of a lift truck. The maintenance inspector is using one of the new type Magnaflux units which he wheels around the plant and plugs into any convenient 110 volt outlet to obtain the necessary high amperage magnetizing current for inspection with Magnaflux at greatest effectiveness.



 H-21 TRANSPORT HELICOPTER

MONORAIL
Gives Helicopter
 FIRST LIFT

AMERICAN MONORAIL CRANES
 HELP ASSEMBLE THE FAMOUS
 PIASECKI H-21 WORKHORSE

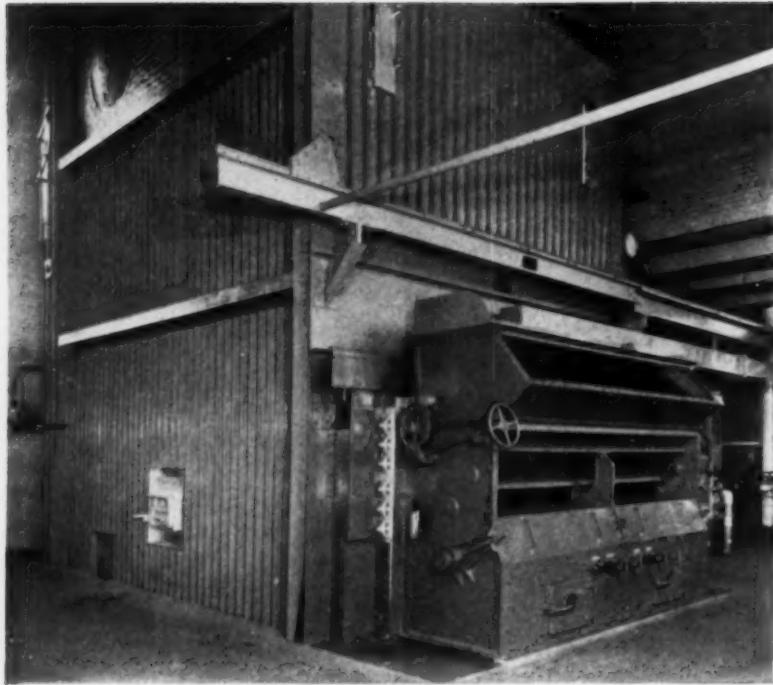
Covering over 600,000 square feet of operating area in the Piasecki plant, American MonoRail Cranes aid in the assembly of these remarkably efficient helicopters. Overhead handling assures safe and accurate movement of parts into assembly with maximum speed. American MonoRail engineers are experienced in all phases of "up and over" handling. They are available for free consultation at your convenience.

Write for our C-1 Bulletin.

THE AMERICAN **MONORAIL** COMPANY

13105 ATHENS AVENUE

CLEVELAND 7, OHIO



They've learned about PLIBRICO

at the University of Detroit



Along with a lot of other major educational institutions the University of Detroit is doing some growing. During last year's part of their expansion program, the Motor City's big university called upon Plibrico for a complete Plibrico setting for their new 550 hp Vogt Boiler equipped with a Stowe stoker.

You see this trim installation, with its advanced Plibrico Multi-Rib enclosure, in the foreground of the photo above. It is Plibrico throughout—designed by the Plibrico engineering staff; executed with Plibrico refractories and construction methods; installed by the local Plibrico Sales & Service distributor. It is one more example of the way Plibrico can take over the whole boiler setting problem and deliver a better, more efficient, longer lived installation . . . Yes, and at a far lower ultimate cost.

Whatever your needs—from a simple repair to a complete boiler setting—Plibrico is the answer:

Plibrico has the refractories: Plibrico Jointless Firebrick, the original plastic refractory and Plicast castable refractories, both in grades to meet varying conditions.

Plibrico has the engineering and construction methods: that put superlative refractories into better practice.

Plibrico has the expert installation service: local supervision or complete-erection crews to do the whole job for you . . . from smallest to largest.

All or any part of Plibrico service is as close as your local Plibrico Sales Service distributor. Ask for your copy of the eye-opening 48-page Plibrico catalog.

Plibrico Company

1838 Kingsbury St., Chicago 14, Ill.

PLIBRICO SALES & SERVICE IN PRINCIPAL CITIES

REFRACTORY PRODUCTS • ENGINEERING • CONSTRUCTION

news (continued)

American-Standard Completes New Cafeteria at Louisville

A deluxe cafeteria and two modern recreation rooms were opened recently for employees at the LOUISVILLE Plant of the AMERICAN RADIATOR & STANDARD SANITARY CORPORATION.

The original cafeteria, opened in 1919, was one of the first food establishments in the city serving employees exclusively. One of the largest of its kind in the city, it has been completely modernized during the past six months. Present facilities equal any in the area.



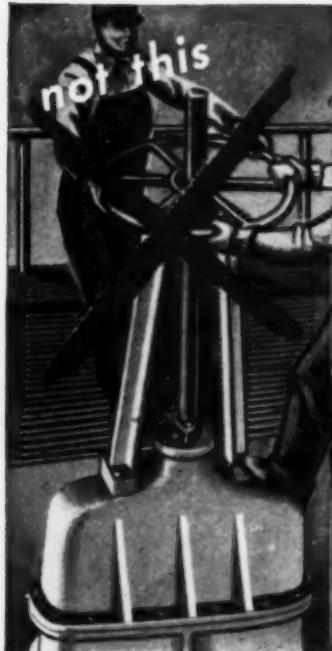
Looking from the entrance across the new cafeteria at the Louisville Plant of the American Radiator & Standard Sanitary Corporation. Owned and operated by American-Standard for its employees these thoroughly modern facilities have a serving capacity of 1750 per hour.

The cafeteria has two dining rooms, seating a total of 500. Lighting is recessed and a modern air circulating and heating system provides a complete change of air every six minutes.

Food is dispensed over three stainless steel serving counters. Two of these are full service lines; the other for quick service snacks and sandwiches. Serving capacity is approximately 1750 per hour.

The American-Standard Plant at Louisville is the largest of the corporation's 46 plants in the United States, Canada and Europe and is one of the largest employers in the city. More than 4000 employees are engaged in the manufacture of a complete line of enameled cast iron plumbing fixtures and chromard plated brass plumbing fittings.

American-Standard also has its research headquarters in newly completed laboratories in Louisville and one of the company's 58 branch houses is also located in the city.



Pushing a Button

is **SAFER** **EASIER** **QUICKER**



LIMITORQUE®

LimiTorque opens and closes any type of valve in a fraction of the time required for hand operation. It is absolutely dependable and safe, even when pressures are so high that manual operation is almost impossible . . . when valves are exceptionally hot . . . and where its location is hazardous or inaccessible.

Yes, instant, positive operation is given to valves located miles away . . . all that is required is the push of a button.

Thousands upon thousands of these "time-tried and tested" Valve Operators are in continuous use, all over the world.

Of course, LimiTorque offers a number of "exclusive advantages" in design and construction, which not only give dependable, safe and speedy performance, but which are your guarantee against damage to valve stems, seats, discs, plugs, or gates . . . not to mention possible physical injury to operators.

If you have valve operating problems, write us — and a "Philadelphia Engineer" will gladly call.

SERVING SOUTHERN INDUSTRY from LYNCHBURG, VA.

For catalogs or detailed information, write Virginia Gear and Machinery Corp., Lynchburg, Va. or the address below.

Philadelphia Gear Works, Inc.



ERIE AVE. AND G ST., PHILADELPHIA 34, PA.
NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Everlasting the valve that IMPROVES with use

In the unique EVERLASTING Valve, the disc never leaves the seat, even when the valve is full open. The disc moves across the sealing surface with a rotating motion, thus regrinding one to the other.

Therefore, this self-grinding movement of the disc across the sealing faces, each time the valve is operated, continuously polishes the sealing faces, with the result that the seal actually improves with use.

This feature, coupled with the fact that the EVERLASTING Valve is quick-acting, easy to operate, and drop-tight, makes it the ideal valve for many services.

For more than 40 years, the simple, sturdy construction and ingenious mechanical principles of the EVERLASTING Valve have built up an enviable reputation for dependable trouble-free operation, long service life, and low maintenance expense.

These valves are widely used throughout industry, and are in particular demand wherever quick and easy operation, leak-proof closure, and thorough reliability are important when handling fluids such as steam, water, oil, acids, alkalies, process liquids, air, etc.

EVERLASTING Valves are made in a range of sizes for various pressures, and are available in a variety of operating arrangements for greatest convenience in the individual installation.

EVERLASTING VALVE CO., 49 Fisk Street, Jersey City 5, N. J.

Everlasting Valves

TRADE MARK "EVERLASTING" REG. U. S. PAT. OFF.

FOR EVERLASTING PROTECTION



Sectional view
through standard
Everlasting Valve

WRITE FOR
BULLETIN

Westinghouse "Automation" Display Coach Visits Plants

"Automation" has been put on wheels by the WESTINGHOUSE ELECTRIC CORPORATION, as the theme of a unique display coach developed by the Standard Control Division. It is being taken directly to design engineers, maintenance people, and supervisory personnel in the machinery manufacturing industry.

A mobile combination of the best features of an auditorium and exhibit hall, the coach shows how common electrical devices such as line starters, control stations, motors, and circuit breakers—the "nuts and bolts" of any electrical system—can be used to achieve successful automation.



With seating capacity for ten persons, the interior of the coach doubles as an auditorium and exhibit hall.

To make it as easy as possible for the customer's people to attend a showing, Westinghouse takes the coach to the customer's plant and runs consecutive 1½-hour programs for groups of ten to twelve engineers at a time. Highlighting the introductory portion are movies on the subjects of "Automation Economics" and "Automation Mechanics."

After the first portion of the meeting (approximately 20 minutes) informal presentations are given at each display—many of which are animated to simulate actual factory conditions. The displays are arranged so that the engineer following these informal talks gets a progressive picture of the best practices of automation today.

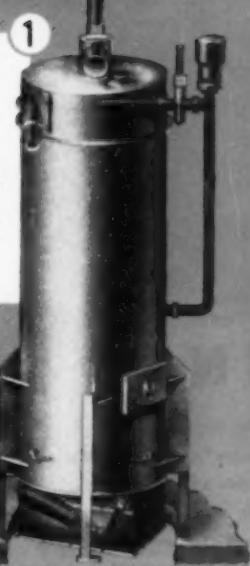
The coach is starting its country-wide tour in the mid-western sector. It is expected that the coach will make some 350 plant visits over a period of 14 months.

How much can these new DUST-handling developments save your plant?



Continuous Vacuum Collector

Collects and dumps material simultaneously, cutting operating time by one-third. Carry-over is reduced to the vanishing point.

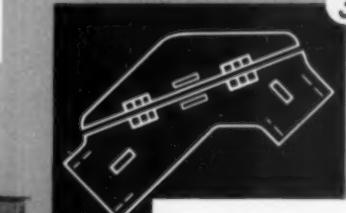


Batch Type

Dust Conditioner

Eliminates dust nuisance during unloading. Automatic operation insures uniform results and ideal end product. A wise investment in critical areas.

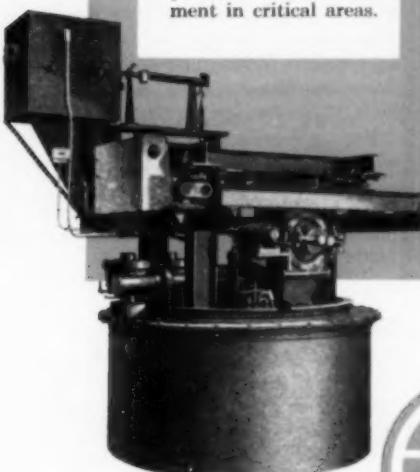
2



Automatic Sequence Head

All system components are controlled by a single master switch. By assuring maximum loading of the transporting air, it gives top efficiency and minimum wear.

You can count on
A-S-H to pioneer
in modern
disposal methods



Impact Fittings with Removable Wearbacks

A complete line of fittings, designed with all joints machined in a single plane. Plastic filler is not needed, and joints maintain their tightness. Wearbacks are interchangeable and are reversible for double life.

These are just a few of the many new components that A-S-H engineers have developed to reduce disposal costs while making cleaner plants. Let these men help you streamline your present system or design a new one for you from scratch. Send today for Catalogs 652 and 752.



THE ALLEN-SHERMAN-HOFF CO. Dept. L — 259 E. Lancaster Ave., Wynnewood, Pa.

Offices and Representatives in Principal Cities

HYDROJET

(hydraulic)

materials handling systems

HYDROVAC

(pneumatic)

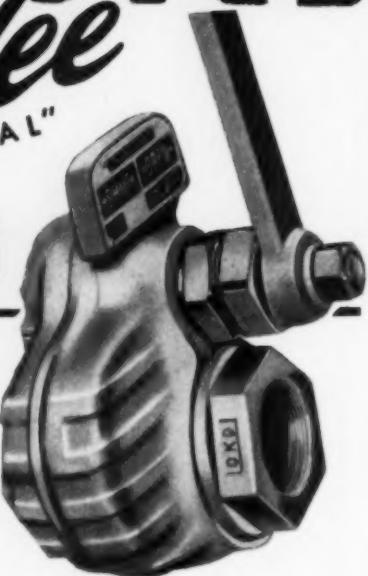
APPROVED

Okadée

"PERFECT SEAL"

VALUES

for
Bubble-tight
Primary
Shut-off in
L P G A S L I N E S



Underwriters' Laboratories, major LP gas producers*, and Liquified Petroleum Gas Commissions of several States* approve Okadée Valves for primary shut-off in LP gas lines. In addition, Okadée Valves are used in virtually all types of gas and liquid lines at pressures to 600 p.s.i. and temperatures to 800° F.—wherever a perfect seal, low maintenance and long life are necessary.

Get complete data, including material specifications, on Okadée Valves — and newest Underwriters' Laboratories test report—without obligation, today.

*Names on request.

- A. S. A. Standard dimensions
- Sizes from $\frac{1}{2}$ " to 6"
- Single- and double-seated disc valves
- Hard-faced valves and seats . . . perfect metal-to-metal seal
- Self-cleaning, self-compensating valve discs
- Lever, rack-and-lever, or worm-gear operation

Underwriters' Laboratories Reexamination Service Guide No. 141 A3.1.22, File MH5163. SL Screwed Type Series and Series 15 and 30 Flanged Type Okadée Valves are suitable as a positive shut-off in LP gas pipelines and other LP gas applications for a working pressure of 250 p.s.i.

Write for Bulletin No. 51FL

- Non-lubricated
- No wedge action
- Valves and seats wear in instead of "wearing out"
- All parts quickly replaceable in the field
- Inside and outside stem packing . . . double assurance against stem leaks



Okadée COMPANY

332 South Michigan Avenue • Chicago 4, Illinois

news (continued)

Johns-Manville—Tex., Mo.

Continued growth of JOHNS-MANVILLE's contract industrial insulation business has led to the appointment of six Regional Construction Managers. Appointments include H. P. BARNES, ST. LOUIS Region; and W. F. QUINBY, HOUSTON Region.

Hart Represents Buggie—Ga.

H. H. BUGGIE AND COMPANY, Toledo, O., manufacturer of connectors and component parts for the electronics and communications industry, announced recently that HART ENGINEERING & SALES COMPANY, 132 Walker St., S.W. ATLANTA, Ga., has been appointed representative for the states of TENNESSEE, GEORGIA, ALABAMA and FLORIDA.

Rust Installs Unloading Facilities at Mobile

THE RUST ENGINEERING COMPANY, of Birmingham and Pittsburgh, has completed the installation of special belt conveyors to handle unloading of bauxite from a new type self unloading ore carrier to railroad at the Port of Mobile for REYNOLDS METALS COMPANY.

The new ore unloading facilities are an addition to a \$750,000 bulk-handling conveyor system that Rust completed last year for the Alabama State Docks and Terminals at Mobile.

Installation of the new conveying equipment will facilitate unloading of Jamaican bauxite from a specially built 12,500-ton ore carrier.

For conversion into aluminum, the bauxite will supplement Arkansas supplies of the ore being processed at Reynolds' Hurricane Creek aluminum plant some 30 miles southwest of Little Rock.

New Vapor Heating Plant

VAPOR HEATING CORPORATION and its manufacturing subsidiary Roth Manufacturing Company, are building a new two million dollar plant in Niles, Illinois.

The new plant will house all the Chicago manufacturing facilities of the company, now located at 4501 West 16th Street, Chicago, with some manufacturing departments in Franklin Park, a suburb. Vapor also has manufacturing facilities in HOUSTON, TEXAS, the TEXSTEAM CORPORATION.

VACUUM ISN'T VACUUM

TO A STEAM TRAP

...It's Just Pressure Below Atmospheric



*"Vacuum-Smacuum
who cares?"*

ONLY 2½¢ per year per trap
parts costs on traps averaging 11 years of service at
Globe Steel Tubes Company, Milwaukee, Wisconsin.

PRACTICALLY ZERO maintenance, complete satisfaction with traps after 12 years service on 10 lbs. pressure, 5" vacuum—Liquid Veneer Corp., Buffalo, N.Y.



Send for 4-page Bulletin No. 223, "Vacuum Isn't Vacuum"—a complete discussion of vacuum, effect on trap selection, causes of vacuum loss, effect of flash steam, etc. Free on request. Just fill in and mail the coupon.

BUYERS are sometimes told that steam traps for vacuum return service must be "different"—requiring, we suppose, some mysterious ability to recognize vacuum and act accordingly.

The truth is that vacuum isn't vacuum to any steam trap. It is just pressure below atmospheric pressure. All vacuum does is increase the pressure differential across the trap orifice. An Armstrong trap doesn't care whether it discharges to vacuum, back pressure or atmosphere. It works just the same in all cases.

Because Armstrong traps don't have to wait for condensate to cool, drainage is fast and equipment temperatures and BTU output are maximum.

Armstrong traps won't cause you to lose vacuum. Any flash steam from their discharge is quickly condensed. *It is the leaky traps that make it hard to hold vacuum!*

The mechanisms in Armstrong traps for low pressure vacuum return service are identical in design, workmanship and materials to those used in traps for 900°F, 950 lbs. pressure. They can't help but operate a long, long time without leaking. This makes it nice for the maintenance man, too.

Fast heat-up, high temperatures, low maintenance, long life—all wrapped up in one package. Ask your Armstrong Representative to go over your vacuum heating system with you.

ARMSTRONG MACHINE WORKS
806 Maple St., Three Rivers, Michigan

ARMSTRONG MACHINE WORKS
806 Maple St., Three Rivers, Michigan
Please send Bulletin 223, "Vacuum Isn't Vacuum"

Name _____

Company _____

Street Address _____

City _____

Zone _____ State _____



It will pay you to look into Bird-Archer's 8 Point Water Treatment Service.

- 1 **PLANT SURVEY**—Complete studies of your use of water or steam including equipment and past performance.
- 2 **STUDY OF ALL AVAILABLE WATER**—Exhaustive analysis of water supplies starting at source.
- 3 **LABORATORY SERVICE FOR SCIENTIFIC ANALYSES**—Modern laboratory facilities with seasoned chemists specializing in water analyses and research.

8

ENGINEERING SERVICES FOR WATER TREATMENT

For Power • For Process • For Cooling



BIRD-ARCHER WATER TREATMENT

THE BIRD-ARCHER COMPANY,
4337 NORTH AMERICAN ST.,
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IN CANADA:
The Bird-Archer Co., Limited, Cobourg, Ontario
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Calderas y Accesorios, S.A., Amsterdam 291, Mexico, D. F.



- 4 **DEVELOPMENT OF TREATMENT AND CONTROL SYSTEMS**—Operational changes where necessary.

- 5 **FURNISHING PROPER CHEMICAL TREATMENTS WHEN REQUIRED**—Bird-Archer custom formulates chemical treatments for your specific problems. Over 60 years background.

- 6 **SPECIFICATION AND FURNISHING OF EQUIPMENT WHEN NECESSARY**—Complete analysis of savings and benefits where additional equipment may be helpful.

- 7 **PLANT STAFF INSTRUCTION**—Your personnel instructed by experienced technicians in accurate control and test procedures.

- 8 **PERIODIC CHECK-UPS**—Your Bird-Archer Service Engineer makes regular personal call-backs on your plant to be sure you get the best possible results.

FOR COUNSEL BACKED BY OVER SIXTY YEARS OF EXPERIENCE CALL BIRD-ARCHER'S QUALIFIED WATER TREATMENT ENGINEERS. CONSCIENTIOUS, PERSONAL ATTENTION AND HIGHEST QUALITY CHEMICALS.

BA-903

Engineering Plus Chemistry Equal BIRD-ARCHER Service

news (continued)

Lion Wins Awards of Honor

LION OIL COMPANY, EL DORADO, ARK., has been presented two Awards of Honor by the National Safety Council for the accident-prevention record established by the employees in 1952. The Award of Honor is the highest industrial recognition for safety achievement awarded by the National Safety Council. Lion was the only oil company in the United States to win this award for 1952.

Owatonna Warehouse, Atlanta

THE OWATONNA TOOL CO., Owatonna, Minnesota, has just inaugurated warehouse service from ATLANTA, GEORGIA. The address is Owatonna Tool Company, c/o Factory Warehouse Service, 76 Fourth St. N. W., Atlanta.

A complete stock of hand tools and pullers, including the company's hydraulic puller system is available.

Schmitt—Emerson Electric

OSCAR C. SCHMITT, President and Director of THE EMERSON ELECTRIC MFG. CO., ST. LOUIS, Mo., suffered a heart attack on April 21, and passed away shortly thereafter. Mr. Schmitt was born in St. Louis in 1894, and in 1910, he became an office worker for Emerson-Electric.

He has been associated with the company since that date, in numerous sales and executive capacities.

VEPCO Promotions Announced

A. H. McDOWELL, JR., executive assistant of the VIRGINIA ELECTRIC AND POWER COMPANY, has been appointed assistant manager of the Richmond district.

A native of Richmond, McDowell attended V.M.I. where he received his bachelor of science degree in 1928. Following his graduation, he joined Veepco in Richmond and during the next five years was estimator for lines in the Engineering Department. In 1933 he was transferred to Williamsburg as distribution engineer and later became superintendent of distribution there. He returned to Richmond in 1941 as assistant to the general manager of the Electric Department of the company.

The new executive assistant is W. A. TEELE, formerly assistant director of commercial and industrial sales. Teele is a native of Roanoke Rapids, N. C., and has been employed by Veepco since 1927.

TOTAL ENGINEERING



The reclaiming of coal from power plant's storage area is facilitated by Link-Belt belt conveyor system. Fed by Link-Belt apron conveyor, 30-in. wide belt conveyor discharges coal in crusher house.

It's your assurance of top efficiency with **LINK-BELT** belt conveyors

HERE'S how "total engineering" works for you when you use Link-Belt Belt Conveyors. First, Link-Belt conveyor engineers analyze your needs—then recommend the *right* components. In addition, Link-Belt can supply all related equipment—other types of conveyors, feeders, elevators, car dumpers and shakers. And Link-Belt will build your supporting structures and enclosures... install the job completely, if desired. Call the Link-Belt office near you for any engineering assistance you need.

LINK-BELT

BELT CONVEYOR EQUIPMENT

13-280-8

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales offices in Principal Cities.

LINK-BELT builds a complete line of belt conveyor components

ALL TYPES OF ROLLER BEARING IDLERS



COMPLETE TERMINAL MACHINERY



Little stories of big savings in LAGONDA tube cleaning

The case of the Insistent Engineer



Happened at an important middle western utility. One of the engineers kept insisting that the water treatment they were using should be supplemented by occasional mechanical tube cleaning, which had not been used for four years. Nobody believed him, but his persistence finally won out to the effect that they consented to clean one boiler with Lagonda tube cleaners, just to see. Result, startling increased efficiency of the unit, an unexpectedly large amount of scale removed, and the scheduling of Lagonda cleaning for all the boilers not only in that plant, but in all other plants of the system. Further result, orchids for the insistent engineer.

Y-2-1

GET BULLETIN Y-29
with details on all types of cutter heads and motors for cleaning all tubes, small, large, curved, straight. On request.

LAGONDA
...the oldest name in tube **cleaning!**

ELLIOTT COMPANY
LAGONDA DIVISION • SPRINGFIELD, OHIO
Plants at: Jeannette, Pa. • Ellwood, Pa. • Amherst, N. J. • Springfield, O. • Newark, N. J.
DISTRICT OFFICES IN PRINCIPAL CITIES

news (continued)

Lewis-Shepard—Alabama

LEWIS-SHEPARD, Watertown, Massachusetts, manufacturers of industrial trucks, have announced the appointment of A. W. HOOPER as exclusive representative for the state of ALABAMA. Mr. Hooper will be located at 5245 Fifth Avenue South, Birmingham 6, Alabama.

PEC Promotes Stultz

THE POTOMAC EDISON COMPANY, Hagerstown, Maryland, has announced the appointment of D. E. STULTZ as executive vice-president.

Mr. Stultz, who has been serving as vice-president in charge of the company's commercial operations, is a native of Frederick, Md. He entered the employ of the Hagerstown and Frederick Railway Company in 1919 and served in various capacities in its electrical department until he was transferred to Berkeley Springs, W. Va., as district manager. In 1924, Mr. Stultz became district manager of the Northern Virginia Power Company at Winchester, Va. He later served as general commercial manager of the Potomac Edison System, with offices in Hagerstown, Md.

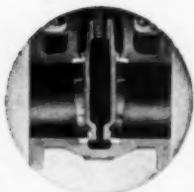
Escher Wyss Rights Granted Cleaver-Brooks

Broad sales and manufacturing rights for the North American Continent have been granted CLEAVER-BROOKS COMPANY, Milwaukee, Wis., by Escher Wyss Company of Zurich, Switzerland.

Cleaver-Brooks is engaged in the manufacture of boilers, distillation equipment, industrial oil and gas burners and bituminous heaters. In anticipation of expanded production, the company is pressing new construction at its main plant in Milwaukee to ready approximately 50,000 sq ft of factory space and extensive tooling to handle manufacture of the new lines scheduled to start in the last half of 1953.

Escher Wyss Limited, founded in 1805, is a designer and manufacturer of hydraulic turbines, pumps, steam and gas turbines, centrifugal and axial flow compressors, heat exchange apparatus and evaporation equipment.

The arrangement between the two companies will entail the Americanization of Swiss designs, and the establishment of sales and service organizations.



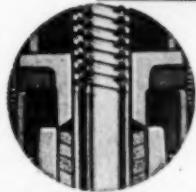
Straight-Flow Port Design reduces fluid turbulence to a practical minimum.



Seat Rings of end-seated type are screwed into the body.



Sure-Grip Malleable Handwheel for non-skid gripping even with heavy gloves.



Brass Liner on Glands assures greater resistance to corrosion and scoring.

WALWORTH

iron body gate valves

with screwed or flanged ends



For complete information on these new Walworth Iron Body Valves, see your local Walworth distributor, or write for bulletin 106.

... 8 Outstanding Features

WALWORTH

valves and fittings

60 EAST 48th STREET

NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



T-head Disc-to-Stem connection on OS&Y types provides stronger connection, prevents loosening of disc by corrosion.



Bronze Back-Seat Bushings in bonnets of OS&Y valves.



Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.

news for the South and Southwest (continued)

B&W Engineering Office, Fla.

The third engineering office of THE BABCOCK & WILCOX COMPANY to be located in the State of Florida within the past two years will be opened in Miami. The two previously opened offices are at St. Petersburg and Tampa.

The new office will be in charge of J. E. V. DINGEMANS and W. H. BARRERE, who have been transferred from Barberton.

The Florida locations were chosen to utilize engineering and draftsmen skills of the area. The expediting of engineering drawings in the new offices will help utilize more fully the increased output made possible by the Boiler Division's five new plants in the Southern States, thus stepping up delivery of badly needed boilers.

Employment at the St. Petersburg office has now reached 140, with about 30 at the Tampa office. The new Miami office will open with an initial employment of 30.

Cleco Florida Distribution

THE CLECO DIVISION of the REED ROLLER BIT COMPANY, HOUSTON, TEXAS, has announced the appointment of HARRY P. LEU, INC., ORLANDO, FLORIDA, as distributor for Cleco products.

The company manufactures the Cleco and Dallett lines of air tools and accessories—including tools for construction, manufacturing, metal fabrication, foundries, industrial maintenance and stone carving.

Reliance Electric—Atlanta

Appointment of THOMAS D. JOHNSON to the ATLANTA, GA., sales application engineering staff of the RELIANCE ELECTRIC & ENGINEERING COMPANY, Cleveland, O., manufacturers of motors and motor-drives, has been announced by E. G. Orahood, Southeastern District Manager.

Johnson will make his headquarters at the company's Atlanta office, 427 Candler Bldg. His addition to the southeastern district sales organization broadens the availability of the company's applied engineering and technical service to users of motors, motor-drives, gearmotors and related electrical equipment in this area.

Born in Newberry, S. C., Johnson graduated in 1948 from Clemson College with a B. S. degree in Electrical Engineering. Previously he had been in military service.

Special Teletype System Solves Sales Order Transmittal Problem for Krafco

System simultaneously prepares customer acknowledgments, sales records, and invoices in Dallas, Texas, office, and shipping tallies in the Monroe, Louisiana, factory.

KRAFCO Container Corporation, a leading Southern manufacturer of corrugated fibre shipping containers, has installed a new system for the transmission of orders which will be of interest to other companies having a factory in one city and main offices in another.

Krafco maintains executive offices and general sales offices in Dallas, Texas. Their manufacturing plant is in Monroe, Louisiana. In an industry where rapid service to customers is essential, it was necessary that a quick and accurate system be devised for transmitting orders from the sales office to the factory. Working in conjunction with the Telephone Company and the Standard Register Company, a teletype system was evolved which simultaneously prepares customer acknowledgments, sales file rec-

ords, invoices in the Dallas office, and factory orders and shipping tallies in the factory office at Monroe.

Operational Data

Either private line or the regular teletypewriter exchange can be employed with this system. Some special equipment is required on the teletype machine itself, however. In order to line up the forms at both ends of the circuit and keep them in line during the message transmission, the forms must be perforated along the edges and guided across the teletype platen by means of sprockets which are coaxial with, and attached to, the platen roll. Krafco has successfully printed eight copies of assorted forms on one teletype machine. More copies can be secured

by adding teletype receiving-only machines in series with the primary teletype machine.

The system is very versatile in its application to the special needs of its user. Where several types of forms are being used by different departments, each department can have its own teletype machine to provide its own forms. By means of patching keys, the teletype operator can control transmission to any department, or combination of departments, which the situation requires.

In order to keep actual transmission time to a minimum, all messages are first cut on a tape in teletype code. Since the code is not easily read by persons other than teletype operators, a regular order form is prepared in standard type at the same time the tape is cut. This form can then be checked for accuracy. If perfect, the circuit is opened and the tape is transmitted uninterrupted. If any errors are detected, they can be corrected as the tape is being sent, by stopping the tape just before the error, manually inserting the correction, and then returning to tape transmission. By filing the teletype tapes, they can be reused whenever desired to produce additional sets of forms for any or all departments which may require them.—R. H. Haas, Krafco Container Corp., Dallas, Texas.



FLUORESCENT LAMPS need constant voltage for maximum operating efficiency and lamp life.



Manual and Automatic Inductrols in sizes (left) 6 to 9.6 kva and (right) 12 to 24 kva.

Maximum equipment life—less operating cost with G-E voltage regulators

You can eliminate the harmful effects of undervoltage and overvoltage on your a-c electric equipment by installing G-E Inductrols. These dry-type regulators automatically maintain correct voltage and insure peak operating efficiency.

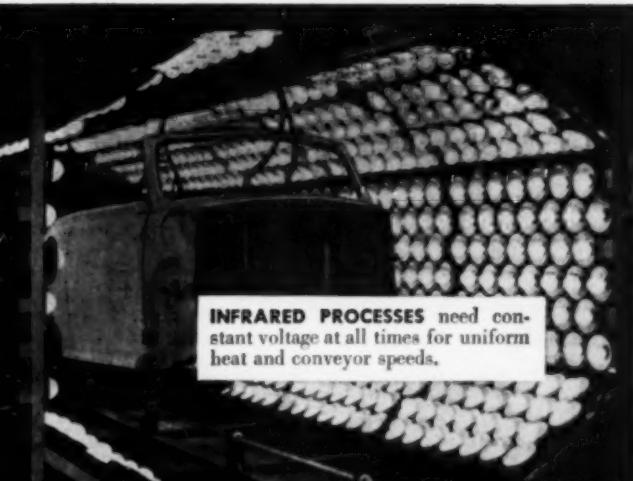
Standard automatic regulators are available for circuits from 3 kva, 120 volts up to 520 kva, 600 volts either single- or three-phase. For more information, contact your nearest G-E Sales Representative, or write for Bulletins GEA-5824, GEC-795 and GET-2351. General Electric Company, Section 423-202, Schenectady 5, New York.

You can put your confidence in—

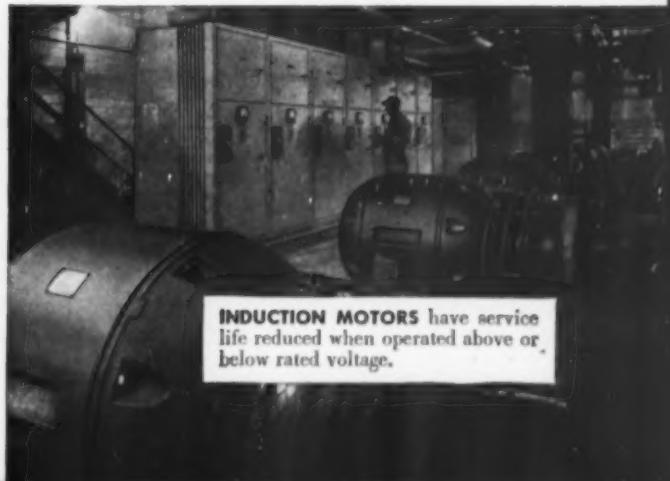
GENERAL ELECTRIC

WHY YOU NEED GOOD VOLTAGE

EQUIPMENT	10% UNDERTENSION	10% OVERTENSION
INCANDESCENT LAMP BULBS	Cuts light output 30%—slows production	Cuts life 70%—triples costs
A-C MOTORS	Overheat—ups maintenance costs	Lowers power factor—ups power costs
RESISTANCE HEATERS	Cuts heat output 19%—slows production	Overheats—ups replacement costs
ELECTRONIC DEVICES	Probably destroy gas-filled tubes	Only 5% over cuts tube life 50%
INFRARED PROCESSES	Ups process time—slows production	Blisters, scorches—ups production cost



INFRARED PROCESSES need constant voltage at all times for uniform heat and conveyor speeds.



INDUCTION MOTORS have service life reduced when operated above or below rated voltage.

Make boiler water level checking



Reliance Alarm Water Column
No. W450-C12 and EYE-HYE
E901 form the Safety Team at
the Philadelphia brewery of
C. Schmidt & Sons, Inc.

THE safest way to prevent boiler water level accidents and costly shut-downs is the combination of *visual* and *sound* indications. You're doubly safe when operators can check EYE-HYE's convenient, clear-cut reading right at their control station *augmented* by the alarm on your Reliance Safety Water Column. You don't want that alarm to sound, but it's there, ready to prevent an oversight if gage-reading is delayed. Make *doubly sure* with the Reliance Safety Team. There's a Reliance Representative near you—glad to check your requirements—or write to the factory.

THE RELIANCE GAUGE COLUMN CO., 5902 Carnegie Ave., Cleveland 3, Ohio

The name that introduced safety water columns....in 1884

Reliance®
BOILER SAFETY DEVICES

news (continued)

FUTURE EVENTS Of Engineering Interest

AMERICAN SOCIETY FOR TESTING MATERIALS, Sheldon E. Fitterer, Development, 1916 Race St., Philadelphia 3, Pa. June 29-July 3, 56th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

AMERICAN CHEMICAL SOCIETY, Alden H. Emery, Exec. Sec'y, 1155 16th St., Washington 6, D. C. Sept. 6-11, Fall Meeting, Conrad Hilton Hotel, Chicago, Ill.

AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, Stephen L. Tyler, Exec. Sec'y, 120 East 41st St., New York 17, N. Y. Sept. 13-16, Fairmont and Mark Hopkins Hotels, San Francisco, Calif.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 29th St., New York, N. Y. Sept. 21-28, Industrial Instruments and Regulators Division and Instrument Society of America Exhibit and Joint Conference, Sherman Hotel, Chicago, Ill. Sept. 28-30, Petroleum Mechanical Engineering Conference, Rice Hotel, Houston, Texas.

Oct. 5-7, Fall Meeting, Hotel Sheraton, Rochester, N. Y. Nov. 29-Dec. 4, Annual Meeting, Statler Hotel, New York, N. Y.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, A. B. Campbell, Exec. Sec'y, 1061 M&M Bldg., Houston 2, Texas. Oct. 7-9, South Central Region, Meeting, Mayo Hotel, Tulsa, Okla.

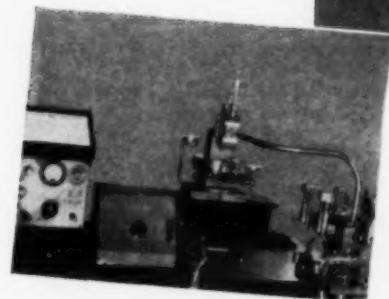
Combustion Control Corp. Atlanta and Dallas

COMBUSTION CONTROL CORPORATION, 720 Beacon St., Boston, Mass., has announced the appointment of KENNETH R. BLAINE as ATLANTA, GEORGIA, area office manager, and ADOLPH J. ERICKSON as area office manager in DALLAS, TEXAS.

Mr. Blaine, whose address is 3627 Belvedere Lane, Decatur, Georgia, was formerly with Dodge Engineering Company and Gibson Engineering Company of Washington, D. C. Prior to his employment with these firms he was in charge of all power plant equipment at the Pawtuxet River Naval Air Station in Maryland. He joined Combustion Control Corporation in 1952 as sales engineer in the Washington office. His activities now cover Florida, Georgia, North and South Carolina, Tennessee, Maryland, and Washington, D. C.

Mr. Erickson was formerly manager of the San Francisco area office, after having been associated with the Matson Navigation Co. and the Pacific Gas & Electric Co. as plant engineer, and with C. C. Moore & Co. as service engineer. His office is at 2711 Commerce St., Dallas, Texas, and his area includes Texas, Oklahoma, Arkansas, Louisiana, and New Mexico.

WHERE KNOWLEDGE IS POWER



Knowledge is POWER when it is put to practical use. Here are examples:

- Intensive investigation by P.P.&E. into graphitization of steel piping resulted in the development of materials and methods that inhibit this cause of power piping failure.
- Model testing, as applied by P.P.&E., makes possible complete analysis of a complex piping system as a check against theoretical calculations — thus helps to avoid excessive stresses, reactions, and movements in the final system which could damage anchors and other equipment, and affect joints.
- Ultra-sonic testing — a unique non-destructive method employed by P.P.&E. — assures quality control of materials and welding.

This type of knowledge — plus the practical experience P.P.&E. has acquired during fifty years of specialization IS power — because it results in greater safety, higher efficiency, and longer life from high-temperature, high-pressure piping.



**Pittsburgh Piping
AND EQUIPMENT COMPANY**

10 Forty-Third Street — Pittsburgh, Penna.

Atlanta Whitehead Building
Boston 10 High Street
Chicago Peoples Gas Building
Cleveland Public Square Building

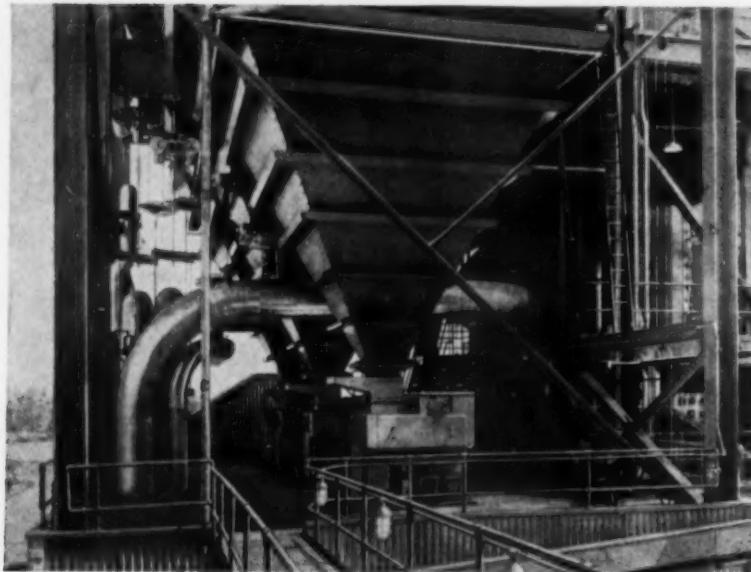
Houston Heights State Bank Bldg
New Orleans P. O. Box 74
New York Woolworth Building
San Francisco 785 Market Street

Carolina Power & Light

again specifies

Richardson

Richardson Automatic Coal Scales are playing a vital part in helping supply power for the new Industrial South. Here are Richardson Model 39's in an outdoor installation at the new generating station of Carolina Power and Light.



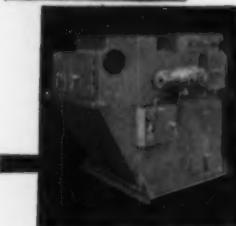
To both industrial and utility power generating stations, specifying Richardson means—

- 1 A 24" x 24" inlet opening and 26" wide belt for maximum coal flowability.
- 2 All wiring and controls outside coal chamber.
- 3 Access doors which will not spill dust on floor when opened.
- 4 Beam ratio test facilities outside coal chamber.
- 5 Gravity operated by-pass, with no restriction of coal flow to downspout.
- 6 No drag links or wires attached to weigh hopper.
- 7 Nationwide after-delivery service.

Latest development in the 39 Series of Richardson Automatic Coal Scales is the Model H-39 shown below. May we send you our new 16-page engineering data book on the H-39 Coal Scale (Bulletin 0352), without cost or obligation?

RICHARDSON SCALE COMPANY • Clifton, New Jersey

Atlanta • Buffalo • Boston • Chicago • Detroit • Houston
Minneapolis • New York • Omaha • Philadelphia • Pittsburgh
San Francisco • Wichita • Montreal • Toronto



Richardson—
MATERIALS HANDLING BY WEIGHT SINCE 1902

Equipment and Supplies

(Starts on page 8)

cleaning supplies. A Kex licensee provides a regular pick-up and delivery service, eliminating the need for inventory control and storage space on the part of users.

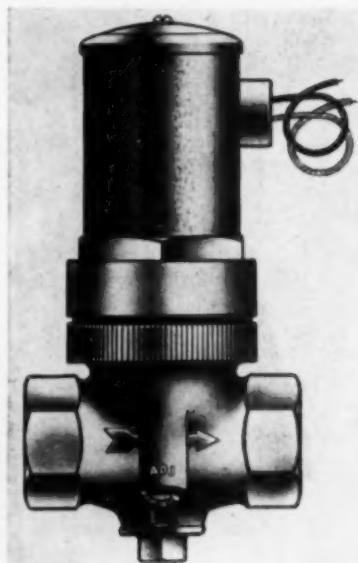
The sweeping tool and scientific, non-drying, chemically-processed cloths pick up dust and dirt, hold it and completely remove it from the premises. It is not stirred into the air and re-deposited. Processing assures that no film will be deposited. Safe for all floors—asphalt, tile, linoleum, wood, rubber, etc.

Solenoid Valve Design

J. D. GOULD COMPANY, 730 G-9 E. Washington St., Indianapolis 2, Ind., is marketing a line of solenoid valves featuring improved design.

"Greenclad" coils are waterproof—hermetically sealed in molded thermoplastic casing, for temperatures up to 250 F. "Whiteclad" coils are for temperatures to 450 F, Class H insulation, silicone and glass.

The three moving parts—pilot valve, piston, and spring—are bronze and stainless steel. Internal parts are accessible without removing valve from line or breaking electrical con-



J. D. Gould Company's type D-DL for adjustable flow control; manual opening and cushioned closing; has special features for hydraulic elevator and lift applications.

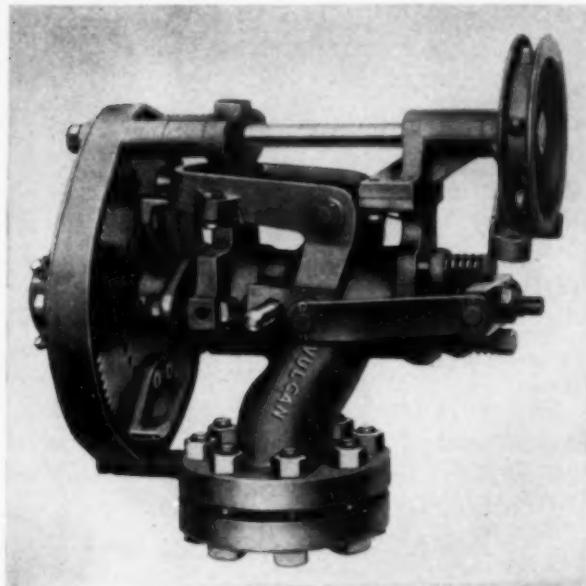


VULcomatic E-4 air-operated rotary head for automatic soot blowing. E-4-E has electric motor drive. Either may be cut into service by push button—or operated in automatic sequence. Cleans effectively. Easily installed and maintained.

Write for Bulletin 1006-A.

**proved on big BOILERS
tops for small**

Hand-operated Vulcan P-3 is identical with the VULcomatic E-4 except for drive. In fact, it is quickly converted to an automatic unit by replacing the sheave wheel with an air or electric motor. *Write for Bulletin 1005-A.*



You'll find Vulcan Rotary Soot Blowers doing a thorough cleaning job on many high-duty central station and industrial boilers. Their full-pressure cleaning starts at the crack of a valve, and continues through a complete 360-degree arc. Their valves are protected, for corrosive gases are sealed off. Their installation may be at any angle. And all their parts are easily accessible for inspection or maintenance.

You'll also find Vulcan Rotaries—proved on big boilers—are "tops" for small. Whatever your boiler size or pressure—or your method of firing—depend on Vulcan for thorough cleaning and low maintenance.

COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE, PENNSYLVANIA

VULCAN **Rotary** **SOOT BLOWERS**



DIRECT FROM WAREHOUSE TO YOU

FROM our spacious new warehouse, we are making more and faster shipments than ever before to customers throughout the South.

Our warehouse was constructed with *service foremost in mind*: (1) To provide a wider variety of stock items, (2) To make faster deliveries, (3) To furnish a full range of warehouse services—from metallurgical advice to sawing, shearing or flame cutting.

More and more steel users are finding that our service is geared to their needs. Write, wire or telephone when you want steel *in a hurry*—one piece or a carload!



"Service in Step With Southern Progress"

WAREHOUSE DIVISION

Atlantic Steel Company

ATLANTA, GEORGIA • EMERSON 3451

new equipment (continued)

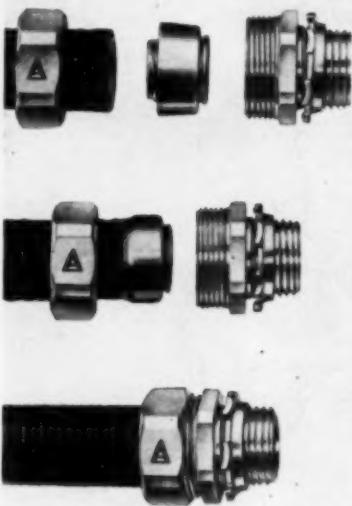
For more data circle item code number
on the postage free post card—p. 17

nctions. Explosion proof housing and other special assemblies are available to meet the most exacting applications.

Only slight pressure drop across the seat is required for operation. Line pressure is the main actuating force. Coil lifts pilot valve only. Valves can be furnished for flow in either direction, closing tightly against flow in one direction only.

Liquid-Tight Connector

APPLETON ELECTRIC COMPANY, 1701-59 Wellington Avenue, Chicago, Ill., has introduced new liquid-tight connectors which are UL-approved for protection of electrical conductors on machinery where liquid-tight flexible conduit is used, and they are especially recommended where a liquid-tight flexible raceway is required.



Top: Ferrule and sleeve assembly, connector body, and hex nut before assembly; Middle: Ferrule is compressed tightly around flexible conduit; Bottom: Complete assembly of Appleton connector.

The design provides for an all-metal flaring ferrule which, under the compressing action of the tightening nut, is joined securely with the flexible conduit. These connectors assure a positive means of excluding oil, water, acid fumes, chemicals, grease and dirt from the wiring system, and provide a positive ground between flexible conduit and connectors.



150-ft. spud barge *A. H. Stall*, with its Cooper-Bessemer-powered Bucyrus-Erie 200-W dragline, is owned and operated by J. Ray McDermott & Co., Harvey, La., and has been in highly successful use on various excavating jobs since January 1951. On this operation the unit is swinging a 6-yd. clamshell bucket on a specially extended 140-ft. boom.

THEY COUNT ON COOPER-BESSEMER
DIESEL STAMINA IN
*putting Louisiana
swampland to work!*

THIS big barge-mounted Bucyrus-Erie dragline, Cooper-Bessemer-powered, is working month after month, 24 hours a day in the swamplands below New Orleans. Here, with this machine, J. Ray McDermott & Company is moving almost 3 million yards of muck to build an endless levee for two huge fresh water reservoirs. In turn, these reservoirs will store millions of gallons of fresh Mississippi water for the mining of sulphur in a vast new dome beneath the marshes.

The levee will be 6 miles long, 100 feet wide at the base, and 12 feet high with a 10-ft. crown—an 8-

or 9-month excavating job! And on a big, hard-to-reach job like this you soon learn the extra value of diesel power you can count on for continuous, trouble-free performance.

Cooper-Bessemer diesels are designed for all kinds of service. They're your best bet when it comes to heavy-duty power.

The
Cooper-Bessemer
Corporation

MOUNT VERNON, OHIO — GROVE CITY, PENNA.

New York Washington, D. C. Bradford, Pa. San Francisco Houston,
Dallas, Greggton, Pampa and Odessa, Texas Seattle Tulsa Shreveport
St. Louis Los Angeles Chicago Coroas, Venezuela Cooper-Bessemer of
Canada, Ltd., Halifax, Nova Scotia Gloucester, Mass. New Orleans, La.

CONSIDER STEAM TURBINES

AS MOTIVE POWER

TO OPERATE
COMPRESSORS
PUMPS
FANS
BLOWERS
WINCHES
GENERATORS
MIXERS
AND
SIMILAR
EQUIPMENT

HERE ARE THE ADVANTAGES:

VERSATILE Wing Steam Turbines give an **DEPENDABLE**: infinite range of speeds, easily controlled by throttling. Always on the job, you are completely *independent* of any electric power failure.

ECONOMICAL: Wing Steam Turbines cost little or nothing to operate where their oil-free exhaust steam can be used in process operations—or in space heating. The Turbine acts as a reducing valve . . . its exhaust steam has been reduced down to the pressures used in heating and cooking operations.

NO SPARKS: Wing Steam Turbines are especially desirable for operations involving explosive gases and flammable materials, where sparks could be dangerous.

SMOOTH ACCELERATION Wing Turbines can **OR DECELERATION**: be smoothly accelerated or slowed down to meet the needs of the process, fan, pump or other driven apparatus.

OPERATING RANGES:

Horsepowers to 150 b.h.p.
Temperatures to 750°F.
Pressures to 600 p.s.i.
Back Pressures to 50 lb.
Speeds to 4000 r.p.m.

WING Steam Turbines have been serving industry for over a half-century. They are known for their rugged construction, trouble-free operation, and long life.

Write us today about further information.
And ask for Bulletin SW-1a.

L. J. Wing Mfg. Co.

169 Vreeland Mills Road

Linden, New Jersey

Factories: Linden, N.J. and Montreal, Can.

Wing



UNIT HEATERS

FANS

BLOWERS

DRAFT INDUCERS

TURBINES

new equipment (continued)

For more data circle Item code number
on the postage free post card—p. 17

Process Control System Cuts Time Lag to Minimum

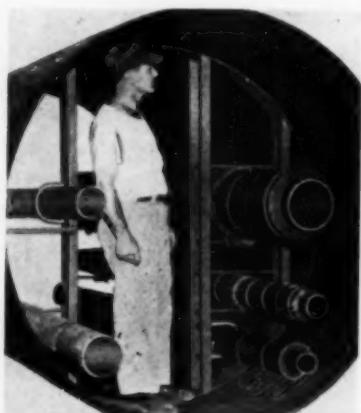
G-11 MANNING, MAXWELL & MOORE, INC., Stratford, Conn., have introduced a new electronic process control system that utilizes the advantages of electric and electronic transmission of measurement and operational signals.

The system measures and controls temperature, pressure, differential pressure, liquid level, and flow, in all processing industries. All controllers can be installed in the control room regardless of the distance from the process area. Components are standardized to permit interchange at the panel.

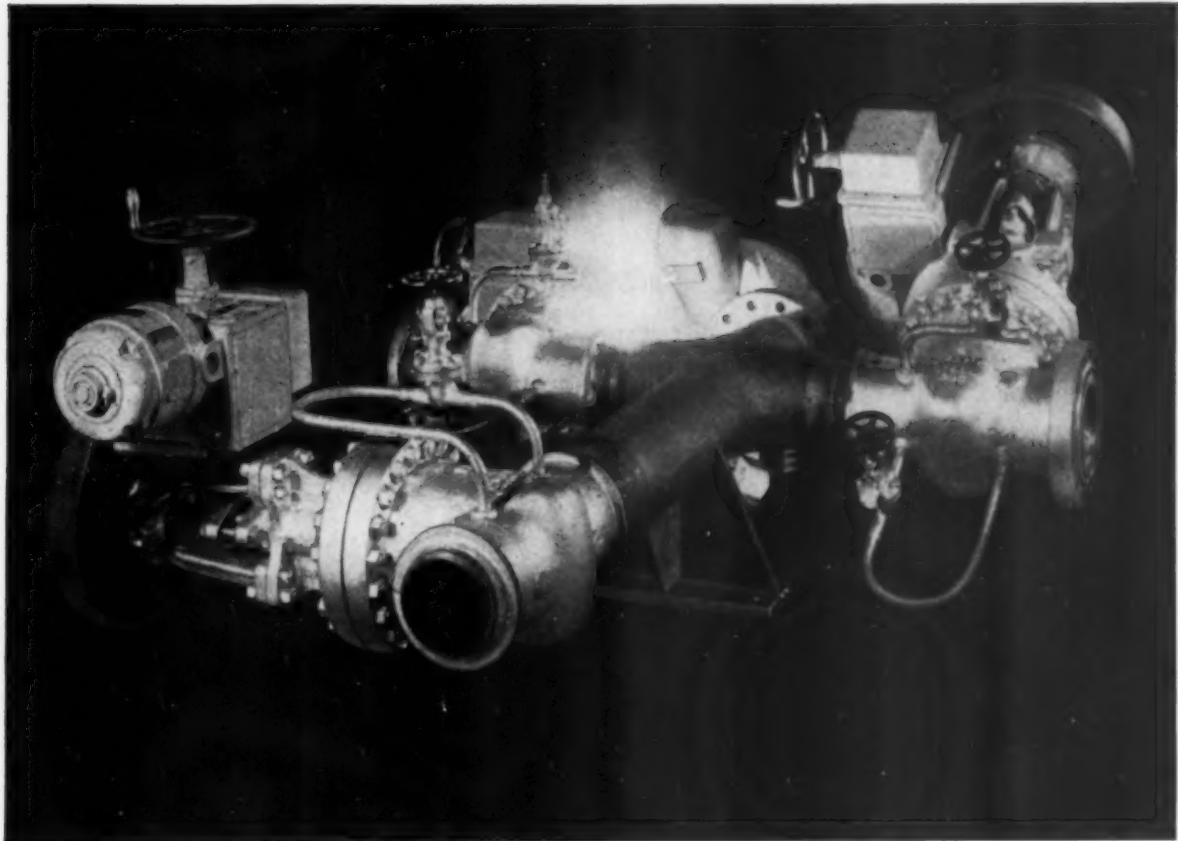
Prefabricated Underground Tunnel Piping System

G-12 THE RIC-WIL COMPANY, Union Commerce Bldg., Cleveland 14, Ohio, has recently developed a large diameter conduit system for protection of underground distribution piping and other utility services.

Known as the Ric-wil Utilidor, the system is completely prefabricated to job requirements with distribution piping for steam, condensate, water lines, fire lines, or process purposes all in place and insulated where required—including traps, valves, and expansion devices. Housing is constructed of corrugated ingot iron conduit, hot-dip galvanized and protected with asphaltic or phenolic resin coatings.



Conduit diameters range from 36 to 84-in. depending on nature and number of services to be housed. Ample walk-through space may be provided in large diameter units.



What's CRANE cooking up here?

[Big Piping Savings for You—

The man behind the mask above is a *unit fabrication* specialist with a talent for saving you time, trouble—and dollars—in the long run.

He's part of a crew of experienced mechanics in one of the big Crane Fabricating Shops, where piping units like this 8-inch assembly are built *precisely* to specification.

And it's a complete as well as a quality service, for Crane takes over at the blueprint stage; supplies all valves and component parts—makes the pipe bends—does the welding. Right at hand are the best facilities

for heat-treating or stress-relieving, radiography, etc., to assure uniform strength and dependability. The finished unit is pre-tested and proved in advance, ready for quick installation in your piping system.

You take no risk—you pay for no spoilages, and your erection crew is spared many a major headache. But, why not let your Crane Representative review your piping layout and help you decide where Crane Unit Fabrication will be to your advantage? There's also further information in your Crane 53 Catalog—or write for Folder AD-1771.

CRANE VALVES

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

SOUTHERN POWER & INDUSTRY for JULY, 1953



BELMONT

PACKINGS

for WATER...STEAM...OIL...



BELMONT 19 . . . for hot and cold water rods and plungers; low and intermediate steam rods.

BELMONT 9 . . . for all hydraulic services from low pressures to extremely heavy duty, hot and cold water.

BELMONT 30 . . . for high pressure steam rods, expansion joints, air, and gas.

for better sealing—LONGER

Regardless of the temperatures or pressures involved . . . no matter what the lading . . . *your* equipment maintenance costs can benefit from longer, more dependable packing life. If you're *paying* for the best—and you probably are—make sure you *get* it by specifying BELMONT Packings in formulations suited to your particular needs.

Don't make do with the next best—*insist* on BELMONT . . . available in a wide range of materials . . . hundreds of styles and types . . . through distributors everywhere.

For technical assistance on packing specifications, write direct—ask for Catalog #40 or detail your particular problems.

4 M-1

THE **BELMONT**
PACKING and RUBBER CO.
Butler and Sepviva Streets
Philadelphia 37, Pa.

FOR STEAM • WATER • OIL • GAS
AIR • ACIDS • ALKALIES • AMMONIA

THERE'S A BELMONT PACKING FOR EVERY SERVICE

THE BELMONT PACKING & RUBBER CO.
PHILADELPHIA 37, PA.

RINGS • SPIRALS • COILS • RHEELS
SPOOLS • SHEETS • GASKETS

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Flow Test Kit

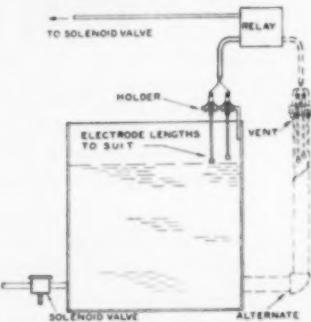
G-13 FISCHER & PORTER COMPANY, 745 Jacksonville Road, Hatboro, Pa., is offering a new portable, wide-range flow test kit for laboratory research and field flow checking work.

The kit consists of five "Pyrex" brand glass metering tubes with five spherical constant-density floats and Instruction Handbook, all contained in a convenient carrying case.

The handbook contains a compilation of performance data for the new "Tri-Flat" metering elements. Performance is predictable with high accuracy and the check calibrations formerly required for low flow rate work are now eliminated.

Simplified Tank Controls

G-14 JOHNSON CORPORATION, Three Rivers, Michigan, manufacturers of steam specialties and boiler room equipment, introduced Johnson Tank Controls, designed to reduce the task of controlling levels in tanks, vats or other vessels to a matter of three standardized components: (1) a Johnson Electrode Holder, (2) a relay and (3) a Direct Operated Solenoid Valve.



Typical installations of Johnson Tank Controls in open tank, showing the three standard components. Electrode holder is suspended from bracket. Solenoid valve opens to admit make-up when level clears long electrode. Dotted lines show alternate mounting of electrode holder.

In operation, two stationary electrodes are suspended in the tank where a circuit between them is established or broken by the rising or falling of the liquid level. This circuit actuates the relay which, in turn, operates the solenoid valve. This valve may be installed in either the tank supply or discharge line, which-

Peerless DEPENDABILITY

STOPS
Pump Troubles
BEFORE THEY START—



PEERLESS TYPE A SINGLE STAGE, SPLIT CASE HORIZONTAL PUMPS

General Characteristics

CAPACITIES: Up to 70,000 g.p.m.

HEADS: Up to 300 feet.

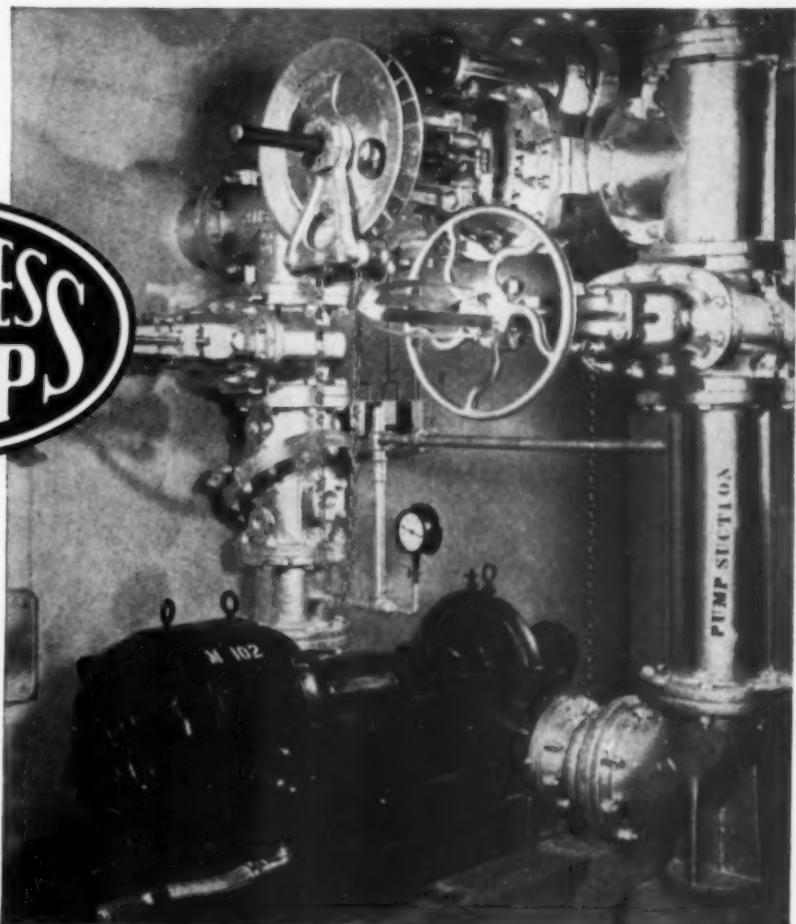
DRIVES: Direct-connected electric motor; belted drives; diesel, natural gas, and gasoline engine; steam turbine; combination drives.

TEMPERATURES: Handles liquids up to 300°F.

DOUBLE & SINGLE SUCTION: (Double Suction Sizes 1 1/4" through 48"; Single Suction Sizes 2" & 3").

BOTTOM SUCTION: (Bottom Suction Sizes 12" through 42").

BALL BEARING: Radial and thrust bearings.



THE QUALITY PEERLESS BUILDS IN is returned to you in service

TYPE A for All purpose pumping

—Peerless Type A pumps can be used in the widest variety of general pumping services, handling water and light alkaline fluids, where no solids are in suspension.

TYPE A for Advanced design—

Peerless Type A pumps are of the ball bearing type with horizontally split cases, for ease of inspection and maintenance. All are furnished with double suction impellers.

TYPE A for All capacities and heads

—Peerless Type A pumps offer users greatest range in capacities, delivering up to 70,000 g.p.m. Type A char-

acteristics permit pumping against heads up to 300 feet.

TYPE A for Ample safety factor—

Oversize shafts, heavy duty ball bearings, wear rings and shaft sleeves all contribute to ample protection against wear, afford a high factor of safety in operation and assure reliable service and extended pump life.

TYPE A for Augmented service

life—Type A pumps are fully tested in Peerless' modern hydraulic testing laboratory, which can duplicate the field conditions under which the pump will be used. Experienced Peerless trained engineers, located near you are at your

service to see that the Type A pump matches or exceeds your requirements.

TYPE A for Accuracy in construction

Bearing seats are cast and bored integral with the case, assuring permanent alignment. Parts are machined to gage on an interchangeable part system.

***** MAIL COUPON FOR BULLETIN

PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

301 West Avenue 26, Los Angeles 31, California

Please send a copy of Type A Bulletin No. B-1300.

NAME _____

COMPANY _____

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CITY _____ STATE _____

So. Pow. & Ind.



PEERLESS PUMP DIVISION

FOOD MACHINERY AND CHEMICAL CORPORATION

Factories: Los Angeles, Calif. and Indianapolis, Indiana.
Offices: New York; Atlanta; Chicago; St. Louis; Indianapolis; Phoenix; Fresno; Los Angeles; Tulsa; Dallas; Plainview;

and Lubbock, Texas; Albuquerque, New Mexico.
Distributors in Principal Cities; Consult your Telephone Directory.

You'll SAVE Muscles and Money with Darts!



Dart seats are wider and spherically ground to a true ball joint. You get a *drop-tight* joint without excessive wrenching. Yes, and you can use Darts over and over again to cut your costs!

QUICK FACTS

- 2 BRONZE SEATS resist pitting and corrosion — stay serviceable year after year
- HEAVY SHOULDERS built to take severe wrenching
- NUT AND BODY of practically indestructible, air-refined, high test malleable iron
- THREADS full, clean-cut and hard. They won't deform or strip

Be sure to say "Darts" to your supplier. They'll save you money and maintenance headaches over the years.

DART UNION COMPANY

Providence 5, Rhode Island

The Fairbanks Co. — Distributors

Boston • New York • Pittsburgh • Rome, Ga.

DART
UNIONS

new equipment (continued)

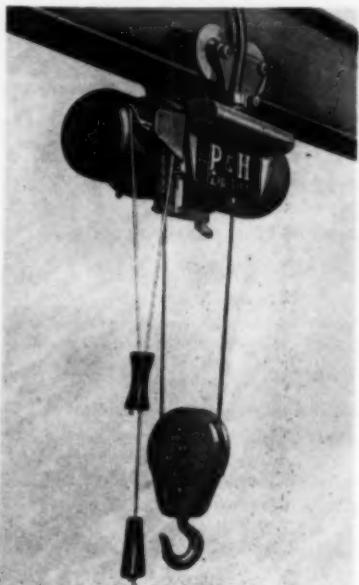
For more data circle Item code number
on the postage free post card—p. 17

ever operating conditions require for proper level control.

Components are available in several sizes to answer a wide range of requirements. They can be used with liquids of all types.

Electric Hoist Design

G-15 HARNISCHFEGER CORPORATION, 4400 W. National Ave., Milwaukee 46, Wis., has announced a new model Zip-Lift Electric Hoist with rope control.

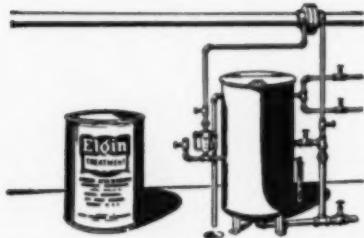


New hoist is a standard Zip-Lift designed to be operated with P&H's one hand rope control.

The hoist is guaranteed to operate continuously during intermittent usage for a period 25 per cent longer than the rated time limit. The new hoist is also designed with a weight-overload safety factor of five times the rated capacity.

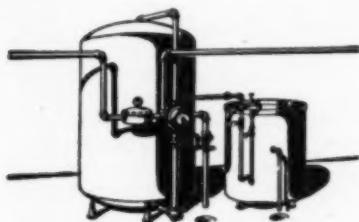
Wire rope hoisting is used because of its wider range of side pull and greater safety from hidden wear. Other regular features included are double brakes, oil bath lubrication, fully-enclosed construction, and grease-packed motor bearings. The new hoist comes in two models with lifting capacities of 500 and 1000 pounds. Hoisting rates are 25 and 13 fpm. Both models are available with 12 ft and 18 ft lift.

Which of these methods will best fit your water conditioning needs?



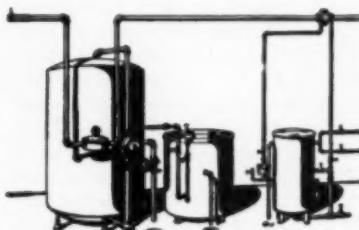
1 CHEMICAL FEED

In many cases, individually prepared Elgin Chemical Treatment alone will effectively prevent scale formation and corrosion.



2 ZEOLITE SOFTENING

A zeolite water softener will efficiently eliminate hardness, scale, and lime deposits.



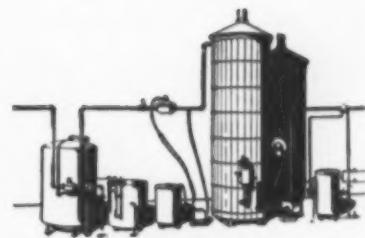
3 ZEOLITE - POST TREATMENT

A zeolite softener, supplemented by chemical treatment will not only eliminate hardness, but will also prevent corrosion.

FOR AN UNBIASED ANSWER . . . CALL YOUR ELGIN MAN

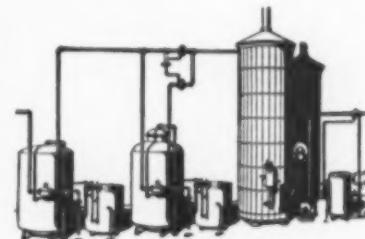
Chances are that one of these basic Elgin systems will fit your water conditioning needs. If not, there is no limit to the number of systems we can "tailor" to your exact requirements and budget.

Whether a simple chemical feed system, a zeolite water softener, one of the many ion-exchange combinations, silica and CO_2 removal, or deionization for the highest quality water known today — you may be sure Elgin can provide the type of system required to produce water of the exact characteristics you require.



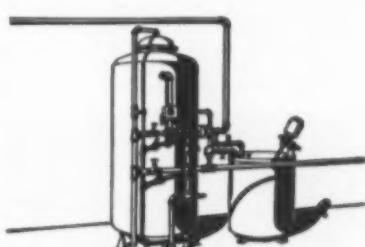
4 ZEOLITE - ALKALINITY NEUTRALIZATION

Water of low-controlled alkalinity, with CO_2 removed, can be produced by acid feed and degasification following zeolite softening.



5 SODIUM - HYDROGEN SOFTENING AND DEGASIFICATION

Blended effluents from a sodium zeolite softener and a hydrogen zeolite softener, followed by degasification, give water in which total solids and alkalinity is reduced and CO_2 is removed.



6 DEIONIZATION INCLUDING SILICA AND CO_2 REMOVAL

Single-tank Ultra-Deionizer produces the equivalent of distilled water, free from silica and CO_2 , at amazingly low cost.



ELGIN SOFTENER CORPORATION

132 North Grove Avenue, Elgin, Illinois

REPRESENTATIVES IN PRINCIPAL CITIES

new equipment (continued)

For more data circle item code number
on the postage free post card—p. 17

Solids in Boiler Water

G-16 HAGAN CORPORATION, P. O. Box 1346, Pittsburgh 30, Pa., announces the availability of complete dropper and burette test units for making the new test for solids in boiler water, developed by Hall Laboratories, Inc., of

Pittsburgh, and said to be comparable in accuracy and simplicity to the conductometric method.

Essentially the test involves mixing the boiler water sample with a strongly alkaline anion exchange resin, and titrating a portion of the resulting solution with acid to the proper endpoint.

A milliequivalent of hydroxide is formed for every milliequivalent of salt in the sample. The volume of standard acid required for the titration, multiplied by a suitable factor,



The new Hall test procedure for solids in water, using the dropper method. A burette method also may be used.

gives an accurate measure of the dissolved solids in the sample.

Two procedures may be used, depending on the degree of accuracy desired. With the dropper test, which can be made in two minutes, results are reproducible to 200 ppm dissolved solids. The more precise burette test requires about three minutes and gives results reproducible to within 25 to 50 ppm.

Lift Truck Design

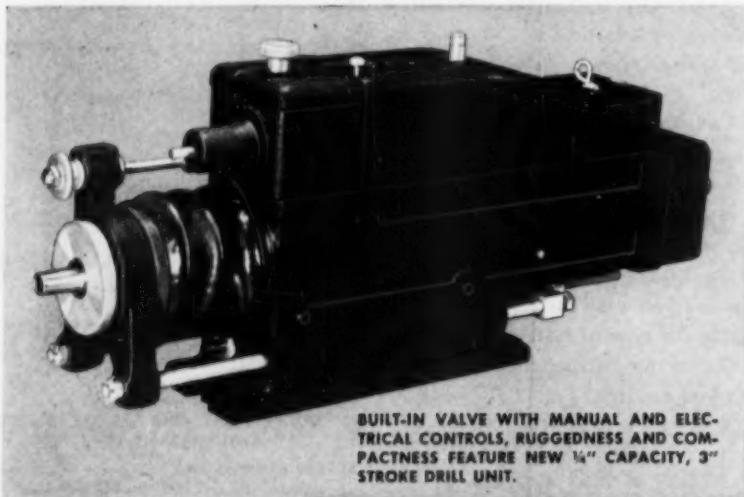
G-17 SAFEWAY INDUSTRIAL EQUIPMENT CORPORATION, 184 North Franklin Street, Chicago 6, Illinois, announces a new portable lift truck, designed for maximum safety with one man operation.

This new unit is made in three sizes with lifting heights of 68 in., 80 in. and 100 in., and has a lifting rating of 1250 lb. The hydraulic system is powered by an automotive type battery and is equipped with a built-in charger with automatic cut-off and trickle charge.

The truck is equipped with an electronic switch to cut off power at maximum height and prevent jarring load and damage to hydraulic system; also hand operated brake which will not only prevent movement of truck when loading and unloading but will brake the truck when traveling up and down inclines.

It can be equipped with a snap-on platform to make it an all around combination lift truck. This unit will perform tasks such as: transferring dies; stacking drums, bales or other heavy objects; loading and unloading vehicles.

BELLOWS-LOCKE DRILL UNIT COMBINES HYDRAULIC FEED, AIR-POWERED TRAVERSE, ELECTRICALLY DRIVEN SPINDLE



BUILT-IN VALVE WITH MANUAL AND ELECTRICAL CONTROLS, RUGGEDNESS AND COMPACTNESS FEATURE NEW 1/4" CAPACITY, 3" STROKE DRILL UNIT.

PRECISION adjustable hydraulic controlled feed rate, coupled with rapid air-powered advance and retract, and a full 3" drilling stroke, make the Bellows-Locke Drill Unit an important component in tool-room-built special purpose machines. Feed rate is infinitely adjustable from 0" per minute up to the maximum speed of the air-powered movement as determined by the air line pressure used.

The Bellows-Locke Drill Unit can be mounted horizontally, vertically, or at any angle. Its small size (21-1/16" long by 3-1/4" wide by 7-11/16" high) lends itself to space saving design. Used with a 1750 RPM motor, spindle speed range is adjustable from 690 to 4630 RPM through the Bellows Speed-Selector Pulley. (Motor and Speed Selector Pulley are optional.)

As standard, the unit is equipped with built-in directional air valve with built-in solenoid, as well as manual start and stop controls. It is available with optional electric controls to provide deep hole drilling with automatic drill cleaning, or time controlled dwell. The Bellows-Locke Drill Unit can be factory equipped with any standard tapping head.

The Bellows Co.
ESTABLISHED 1911
AKRON, OHIO

See your local Bellows Field Engineer or write direct for a copy of the Bellows-Locke Bulletin. Address Dept. SP-753, The Bellows Co., Akron, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., 4972 Dundas St. W., Toronto 18, Ontario.

This special purpose machine at The Perry Fay Co., Elyria, Ohio, uses 8 Bellows-Locke Drill Units to drill twelve 7/32" holes in less than 1-1/2 seconds.

NAVCO "Universal" PIPE SUPPORTS



Vertical adjustment up to $2\frac{1}{2}$ inches can be made.

Support may be turned to any angle of 360° .

Will take care of 8 inches of travel.



NAVCO PIPING

NATIONAL VALVE & MANUFACTURING COMPANY • PITTSBURGH, PA.

NEW YORK • CHICAGO • CLEVELAND • BOSTON • ATLANTA • TULSA • BUFFALO • CINCINNATI



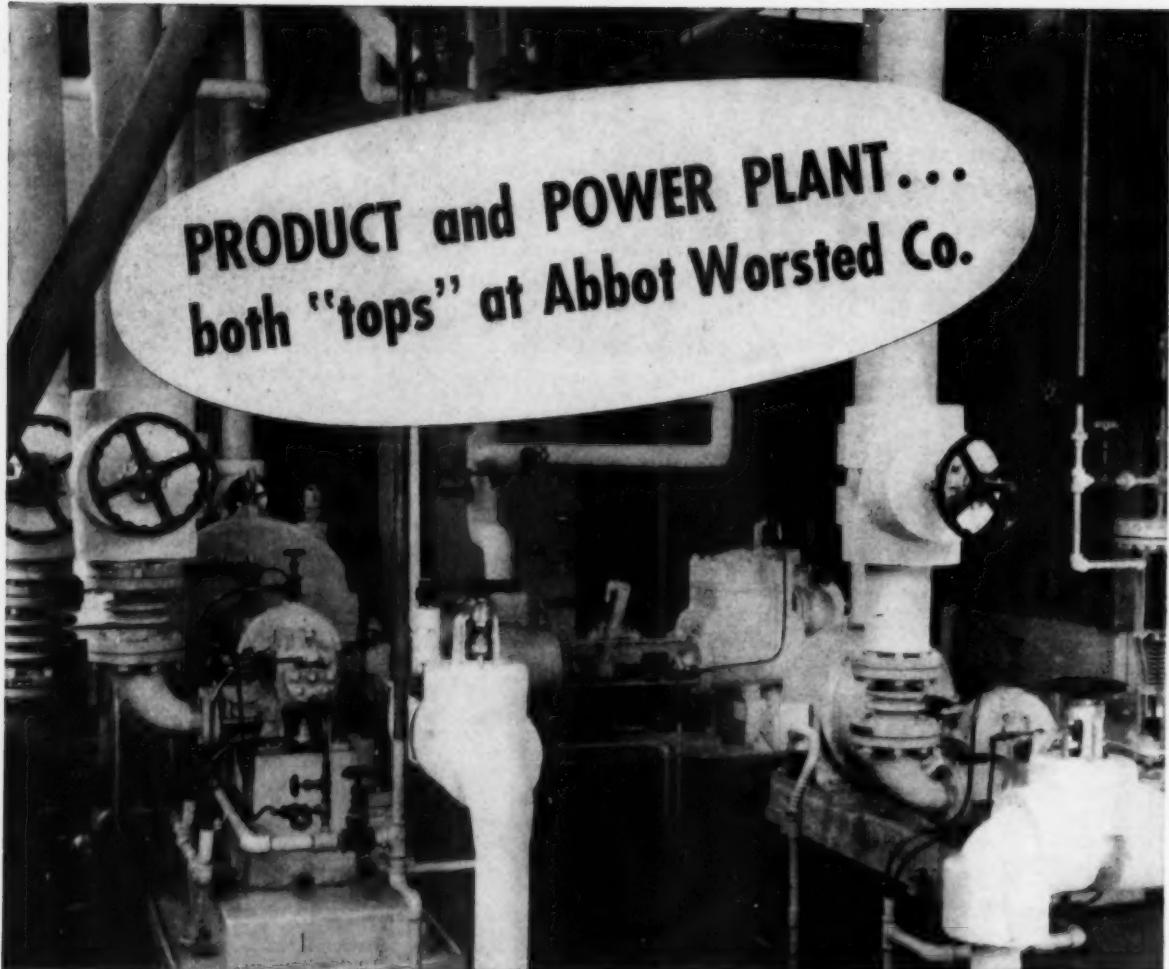
Features

Universal Pipe Supports hold the pipe down as well as up. They prevent pipe from getting out of alignment, which is usual when Roller Supports are used.

They permit control of expansion movement and insure the desired free action of Slip Expansion Joints so essential in tunnel and duct work.

Expansion movement of pipe will not disturb the insulation.

Made in Cast Iron or Steel and provided with forced lubrication for lines exposed to the weather.



PRODUCT and POWER PLANT...
both "tops" at Abbot Worsted Co.

Boiler Feed Pumps in foreground are rated 90 G.P.M., 460 ft. head.
Steam Pump in background is a Warren "Realwear," $7\frac{1}{2} \times 5 \times 10$.



THIS yarn mill, located at Forge Village, Mass., enjoys an enviable reputation in the exceptionally fine spinning of yarns for worsted, camel hair, mohair, and combined synthetic fabrics.

Now they can also look with pride upon an excellent new Power Plant, highly modern both as to equipment and building. Engineering was in

charge of Joseph C. Bogue, Consulting Engineer, 6 Leonard Street, Belmont, Mass., and in cooperation with A. L. Simpson, Plant Engineer.

Warren Pumps, exclusively, both Centrifugal and Reciprocating, were selected for Boiler Feed and other Plant services.

Modernization or expansion . . . Power Plant or Process . . . discriminating buyers specify:

P-29

WARREN PUMPS

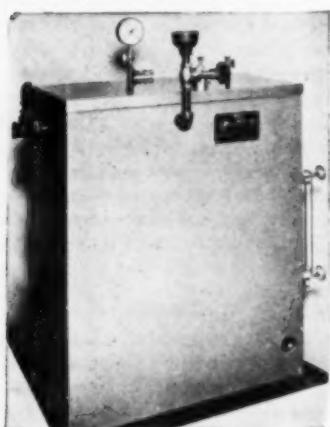
WARREN STEAM PUMP COMPANY, INC., WARREN, MASSACHUSETTS

Centrifugal Reciprocating Rotary



Electric Boiler Unit

G-23 LIVINGSTONE ENGINEERING COMPANY, 100 Grove St., Worcester 5, Mass., has announced a line of electrically operated steam generators utilizing a new conception of electric boiler design.



ABC Series of electrically operated steam generators by Livingstone Engineering is designed especially for 440 v use. Standard units available in sizes up to 60 Bhp.

Identified as Speedyelectric Series ABC they are compact units for installation in press rooms and factories where floor space is limited. The Electrode steam generator can be designed to operate on various voltages at constant amperage, so that the kw rating, heating capacity and steam output vary in direct proportion to the voltage. Utilizing this principle, these new boilers are designed for 220, 440 or 550v but they offer important advantages to those purchasers who have or can make available 440 or 550v power supply. The steam generators operating on 440v require less than $\frac{1}{2}$ sq ft of floor space per boiler hp, approximately one-third to one-half of the floor space required for conventional fuel fired boilers in a comparable capacity range.

Floor Finish

G-24 THE MONROE COMPANY, INC., 10703 Quebec Ave., Cleveland 6, Ohio, has announced a new transparent plastic floor finish which is said to be 100 per cent non-skid.

Called "Skid-Not," the new product is a colorless liquid. When applied with a mop, it is reputed to form an attractive, semi-gloss, non-glare finish that lasts three to four times as

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long as wax. The finish can be applied over varnish or enameled wood, rubber or asphalt tile, cork, terrazzo or magnesite floors. When used after application of Monroe Wax and Oil Remover, it can be applied to floors that have been previously waxed or oiled. The manufacturer states that

it does not in any way change the color of the flooring.

The product is recommended for use wherever a non-slippery, long-lasting finish is required. The company states that rubber skid marks and traffic stains can be easily removed without damage to the finish.

Whether heavy-duty or light-duty, high-speed or low-speed, from oil burners and blowers to pumps and agitators, there is a LOVEJOY Flexible Coupling to meet your exact requirements. They offer the best obtainable insurance against alignment troubles — dampen and absorb starting torque, vibration and shock of intermittent loads . . . protect motor and driven machine . . . lengthen bearing life.

LOVEJOY Flexible Couplings are compact in construction, durable, and provide excellent resiliency. Bodies carefully machined. Cushions available in materials suited to the particular load conditions . . . can be changed without shutdown. No lubrication needed.

• Write today for illustrated catalog with handy selector charts.

Also Mtrs. of Lovejoy Universal Joints and Lovejoy Variable Speed Pulleys.

LOVEJOY FLEXIBLE COUPLING CO.

5011 W. Lake St.

Chicago 44, Illinois

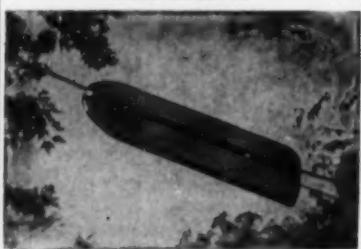
MARTINDALE

COMMSTONE HOLDER



Holds Commstones rigid and true for concentric resurfacing of commutators and slip rings while running at normal speeds in their own bearings. Grinds commutators $4\frac{1}{2}$ to $4\frac{3}{4}$ " wide. Used with two Commstones in stone holder or one Commstone in 2" box.

WIRE CREEPER



A new, speedy method of stringing additional overhead wires over houses, through trees, across congested areas, etc., by means of a remote controlled creeper that carries cord from one pole to next on available wire.

MICA-MILLER



A powerful, light-weight, low cost, easy to use Undercutter, operating from 1/5 h.p. Universal motor. Available with small, medium or heavy duty head (interchangeable). Also available with air motor, or flexible shaft drive.

Write for New 64-page Catalog No. 29 describing these and many other products for Industrial Maintenance, Safety and Production.

MARTINDALE ELECTRIC CO.

221 Third Ave., Cleveland 7, Ohio

new equipment (continued)

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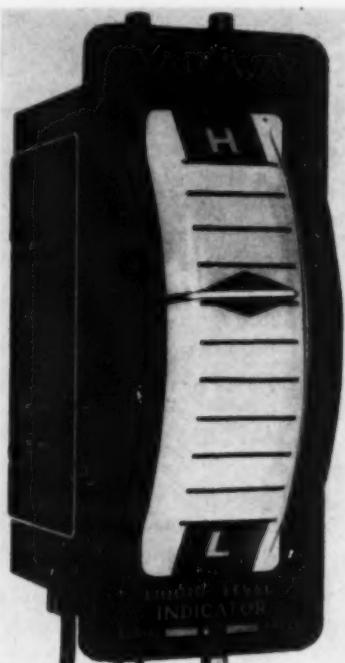
Improved Remote Indicator

G-25 YARNALL-WARING COMPANY, Chestnut Hill, Philadelphia 18, Pa., announces that easier readings of liquid levels are made possible by a new type face and cover plate on Yarway Remote Liquid Level Indicators.

The raised, transparent face permits the indicator arm to be extended under the cover to a position where it can be viewed from the side as well as the front. This improved visibility makes it possible to check boiler water levels or other liquid levels from most any location in the control room or wherever the indicator may be installed.

The indicating mechanism is operated by the boiler water itself, assuring instantaneous, accurate readings. Indicating mechanism is never under pressure. There are no stuffing boxes.

The indicators are of the manometric type, with automatic temperature compensation. They are approved for use under the new ruling of the A.S.M.E. which permits the use of two remote indicators in place of one of the high pressure boiler water level gages on boilers over 900 psi.



The raised, transparent face permits the indicator arm to be extended under the cover to a position where it can be viewed from the side as well as the front.

Electrical Conduit

G-26 THE AMERICAN BRASS COMPANY, Waterbury, Conn., has developed a flexible electrical conduit known as "Sealtite" and approved by Underwriters' Laboratories for use in wet locations.

The tough, extruded synthetic covering over the flexible metal core protects wiring against moisture, oil, dirt, chemicals, and corrosive fumes—on permanent and temporary installations. The conduit is made of spirally wound, interlocked zinc-plated steel strip with a copper bonding conductor wound spirally in the space between each convolution on the inside of the conduit.

Sewer Joint Compound

G-27 THE PHILIP CAREY MFG. COMPANY, Cincinnati 15, Ohio, is producing new, improved Sewertite—a cold, plastic sewer compound.

A scientific formula that combines bitumens, organic additives, asbestos fibres, mineral stabilizers, solvents and a heavy trowel consistency plus a new additive gives the compound extra adhesive powers. Sewertite is acid

NATIONAL AIROIL BURNERS
FUEL OIL-GAS
SERVING INDUSTRY FOR 41 YEARS

- Steam Atomizing Oil Burners
- Mechanical Atomizing Oil Burners
- Low Air Pressure Oil Burners
- Rotary Oil Burners
- Industrial Gas Burners
- Combination Gas and Oil Burners
- Tandem Block Combustion Units
- Fuel Oil Pump Sets
- Refractory Burner and Muffle Blocks
- Valves, Strainers, Furnace Windows

Detailed information gladly sent you upon request.

Established 1912



Incorporated 1912

NATIONAL AIROIL BURNER COMPANY, INC.

1279 East Sedgley Ave., Philadelphia 34, Pa.
Southwestern Division: 2512 So. Blvd., Houston 6, Tex.

and alkali resistant, waterproof, flexible and permanent. Its thermoplastic properties give joints tight but flexible sealing and it provides greater resistance to cracking than the ordinary rigid cement or hot sealing compounds. It requires no heating.

Dry Chemical Wheeled Engine for B & C Fires

G-28 AMERICAN - LAFRANCE-FOAMITE CORPORATION, Elmira, N. Y., has announced the manufacture of a new one-man fire-fighting engine for extinguishing large-scale B and C fires.

This dry chemical wheeled engine has a capacity of 150 lb. Discharging free flowing, quick smothering Alico dry chemical, the new Model 150 is a companion unit to the company's two-man engine with a capacity discharge of 350 lb.

The new engine weighs only 480 lb, fully charged, and can be easily wheeled, maneuvered, and operated by one man. The expellent is dry nitrogen, with a sustained operating pressure of 200 psi. Contents can be discharged in about 45 seconds if necessary.



Alico's one-man fire-fighting wheeled engine has a capacity of 150 lb.

Filament Transformers

G-29 LINDBERG ENGINEERING COMPANY, 2450 W. Hubbard St., Chicago 12, Ill., has developed two new models of filament transformers specifically for industrial electronic applications.

Each unit supplies filament power for two rectifier tubes normally operated under conditions of high voltage to ground or between tubes. This combination of dual duty within a unit enclosure saves space, improves

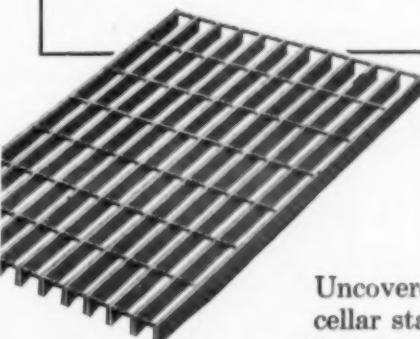
Free additional information is available to readers of *SP&I*. Circle the item code number on one of the reader service post cards provided on pages 17-18.

appearance and simplifies mounting, wiring and handling.

Each unit is compound filled and specially designed and insulated to withstand maximum d-c operating voltage of 12 kv and 17.5 kv respectively. Available in two sizes, 100 va and 200 va., 115 volt primary, dual

5 volt filament supply and equipped with insulating bushings and tube sockets applicable to the tube type which the transformer is to serve. The 100 va size is equipped with tube sockets for use with tube type 575A. The 200 va is equipped with tube sockets for tube type 869B.

Make those **OPEN SPACES**
SAFE and USABLE
with this unique, one-piece
OPEN STEEL FLOORING



SILENT!
STRONG!
SECURE!

Uncovered pits, light wells, cellar stairways, etc., quickly become safe and usable areas when floored with Blaw-Knox Electroforged Steel Grating. Made in one piece . . . no nuts or bolts to rattle or lose. Provides safe footing even when wet or greasy and lasts indefinitely. Admits maximum light and air. Furnished in any shape, cut to fit. Just send dimensional sketch of area to be covered and we will forward price by return mail.

BLAW-KNOX COMPANY
Grating Department
BLAW-KNOX EQUIPMENT DIVISION
2034 Farmers Bank Building, Pittsburgh 22, Pa.

ELECTROFORGED STEEL

BLAW-KNOX GRATING

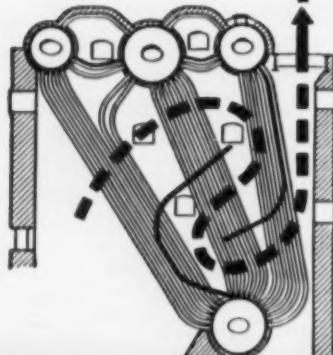
Enco

Extra Power Quickly

...and easily...
with these Fuel-
Saving Baffles

- Provide cross-flow of gases over tubes for maximum heat-transfer
- Tapered gas passes and curved surfaces streamline the gas flow and maintain gas velocity for efficient heat-extraction
- Draft losses materially reduced by elimination of eddy currents, bottlenecks and dead gas pockets
- Less steam used in cleaning because soot blowers are used less often, and more effectively
- Applicable to any design of water-tube boiler, fired by any fuel
- Each installation is designed on the basis of 25 years experience in this specialized branch of engineering
- Installed by skilled mechanics

Ask for bulletin BW 40 giving valuable data on modern baffle-wall constructions — free



THE ENGINEER CO.
Enco

75 West St.
New York, N.Y.

new equipment (continued)

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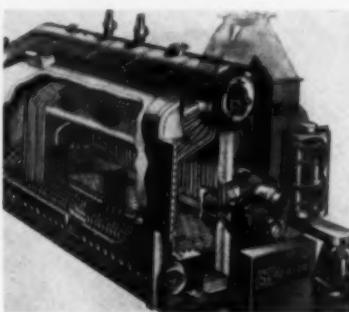
Flashing Bulletin Board

G-30 INDUSTRIAL PRODUCTS COMPANY, 2892 N. Fourth St., Philadelphia 33, Pa., has introduced a new bulletin board designed to bring life to safety posters, plant messages, photographs and other material that may be quickly inserted between two double glass panels.

The device operates on a 40-watt lamp and flashing unit. It flashes approximately 15 times a minute, and carries two separate messages that may be read from a wide angle. It accommodates National Safety Council posters and other sheets up to 8½ in. x 11½ in. The unit is furnished ready for use, complete with rubber cord and plug.

Water-Tube Steam Generator

G-31 SUPERIOR COMBUSTION INDUSTRIES, INC., Room 305, 1475 Broadway, New York, N. Y., has introduced a water-tube steam generator featuring a packaged unit design.



Superior units are built in 9 sizes with capacities ranging from 5,300 to 33,000 lb/hr, and for pressures up to 400 psi.

The generators are shipped complete, ready for operation with minimum installation expense. Built on a structural steel base, they require no brick setting, no pitting, no special foundation, other than a floor capable of supporting their weight. Refractory, insulation, burner, controls, inter-connecting piping and wiring are complete and installed at the factory. Units can be furnished for permanent outdoor installation.

The units are designed to provide fully automatic firing with oil, gas or stoker coal. Dual induced draft fans and divided second pass provide flexibility of firing range.

Electric Sewer Cleaner

G-32 THE OSTER MANUFACTURING COMPANY, 2057 East 61st Place, Cleveland, Ohio, is now marketing its completely new electric "Sewer Master."

The new machine weighs less than 100 lb and clears obstructions 100 ft or more from the sewer entrance.



Nothing conveys an impression of quality and prestige more readily than a perfect business card designed by us.

A letter from you will bring an assortment of the business cards we have made for others.

THE JOHN B. WIGGINS CO.
636 So. Federal Street, Chicago 5

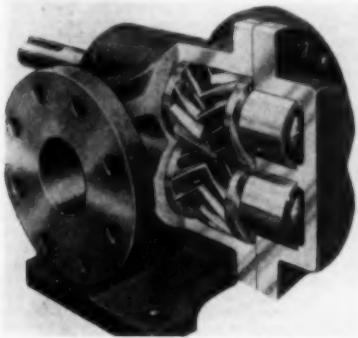
WIGGINS
Peerless Book Form
CARDS

Four large rubber tired wheels and a two-position handle make it easy to move up and down stairs and to the job.

In operation, cutting tools are attached to a coiled spring which is securely held and revolved at any convenient distance from the sewer entrance by the revolving chuck jaws. These cutting tools remove roots, grease, chips, and other obstructions.

Rotary Gear Pump

G-33 SIER-BATH GEAR & PUMP Co., INC., 9252 Hudson Blvd., North Bergen, N. J., has announced a new rotary gear pump of simplified design.



Primarily for positive displacement of lubricating liquids, the "Hydrex" Pump will handle fluids and semi-fluids, 32 SSU to 250,000 SSU. Capacities are 1-500 gpm; 300 psi for continuous duty, 500 psi for intermittent service.

Only two castings are used—for the body and the head; there are only two moving parts—the two rotors; no inner races are needed in the bearings as the shafts are hardened and ground at the bearings; only one stuffing box is used (under suction pressure).

New Line of Taper-Lock Sprockets and Roller Chain

G-34 MORSE CHAIN COMPANY, a Borg-Warner Industry, 7601 Central Ave., Detroit 10, Mich., announces a new line of Taper-Lock Stock Roller Chain Sprockets, as an addition to their present line of stock plain-bore sprockets.

Taper-Lock sprockets offer the advantages of immediate "off-the-shelf" availability from distributors' stocks to meet the requirements of most industrial applications while eliminat-

ing the delay and extra expense of reborning to fit shafts.

They have no flanges or protruding parts and require no more space than standard sprockets. Flush hub design contributes to safe operation. Morse Taper-Lock Sprockets fit any roller chain manufactured to American Standards. Morse distributors will stock a complete range of Type B (hub one side) for immediate delivery in $\frac{1}{2}$, $\frac{3}{4}$, $\frac{5}{8}$, 1 and $1\frac{1}{4}$ in. pitch. Number of teeth range as high as 112. All bushings and the smaller sprockets are individually packaged.

Adjustable-Speed Drive for Low Horsepower Applications

G-35 RELIANCE ELECTRIC & ENGINEERING Co., 1088 Ivanhoe Road, Cleveland 10, Ohio, has developed an improved, all-electric adjustable-speed drive of from $\frac{1}{2}$ to 3-hp.

The new electronic-type variable-speed drive is designed to take care of a steadily growing number of production jobs and processing operations having relatively low horsepower requirements. The drive is said



Reliance Electric's adjustable-speed drive is now available in five sizes— $\frac{1}{2}$, 1, $1\frac{1}{2}$, 2 and 3 hp.

to supply a more economical answer electrically to the problem of securing greater speed-changing flexibility, operational versatility, and control convenience in powering a wide variety of production machines and processing units in many industries, including paper products manufacture, textile, metalworking, wire, food processing, packaging and chemical processing.

EXTRA YEARS

OF MORE DEPENDABLE POWER
and at less cost per pound of steam

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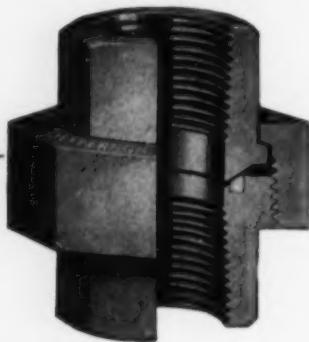
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S-9 PUMPS & COMPRESSORS—Bulletin 546, 6 pages—Describes line of air and gas compressors; dry vacuum pumps; aftercoolers; valves; and centrifugal pumps for boiler feeding, general power plant and industrial applications. Illustrates each item and gives capacities and sizes.—PENNSYLVANIA PUMP & COMPRESSOR COMPANY, Easton, Pa.

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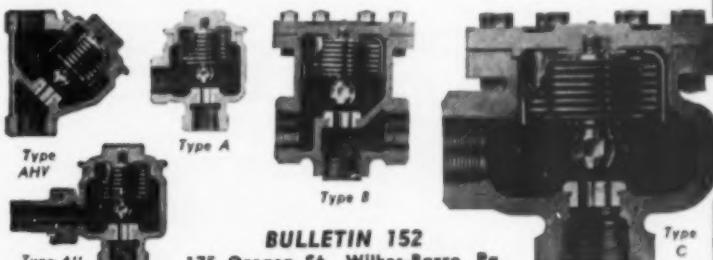
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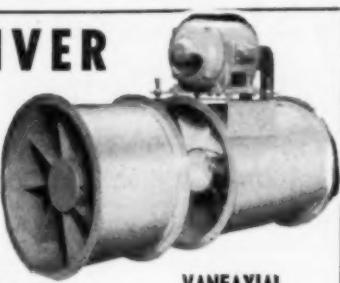
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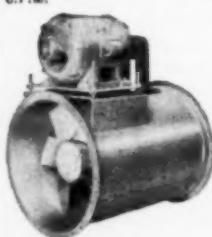
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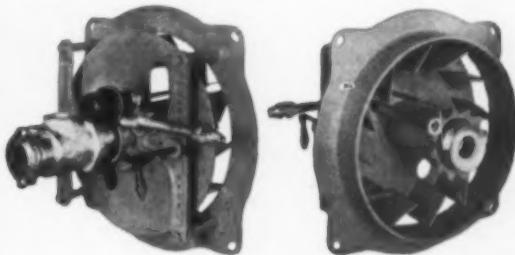
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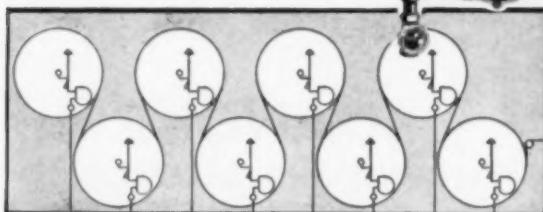
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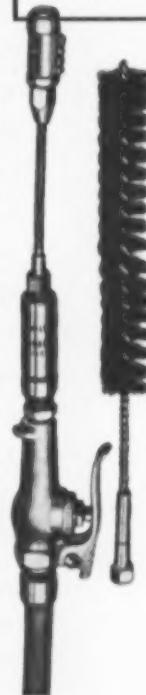
the Wilson Way

Usually a surface condenser tube fails in the first few inches of its length due to inlet end erosion. To protect against this costly deterioration, it is good practice to paint the tube sheets as well as the tube ends with a protective coating. This low-cost cleaning and application kit is designed to do the job quickly and efficiently. Only three simple steps are needed: (1) Clean all the tube ends. (2) Thin coating and squirt it into tube. (3) Attach the paint brush to the air motor and use it for fast, easy spreading.

This Wilson method insures complete removal of dirt, provides excellent paint adherence, makes certain paint is spread evenly on the tube. The work can be done in a hurry . . . with any labor available.

The Wilson Cleaning and Application Kit is but one of many Wilson accessories designed for the proper maintenance of condensers and heat exchangers. For packed condensers, there are packing tools, packing removal counterbores and ferrule wrenches. Wilson also makes a wide range line of tube cutters, tube expanders, flaring and belling tools, tube pullers, etc.

WILSON
CLEANING AND
APPLICATION
KIT

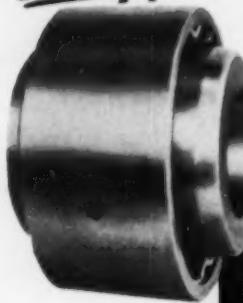


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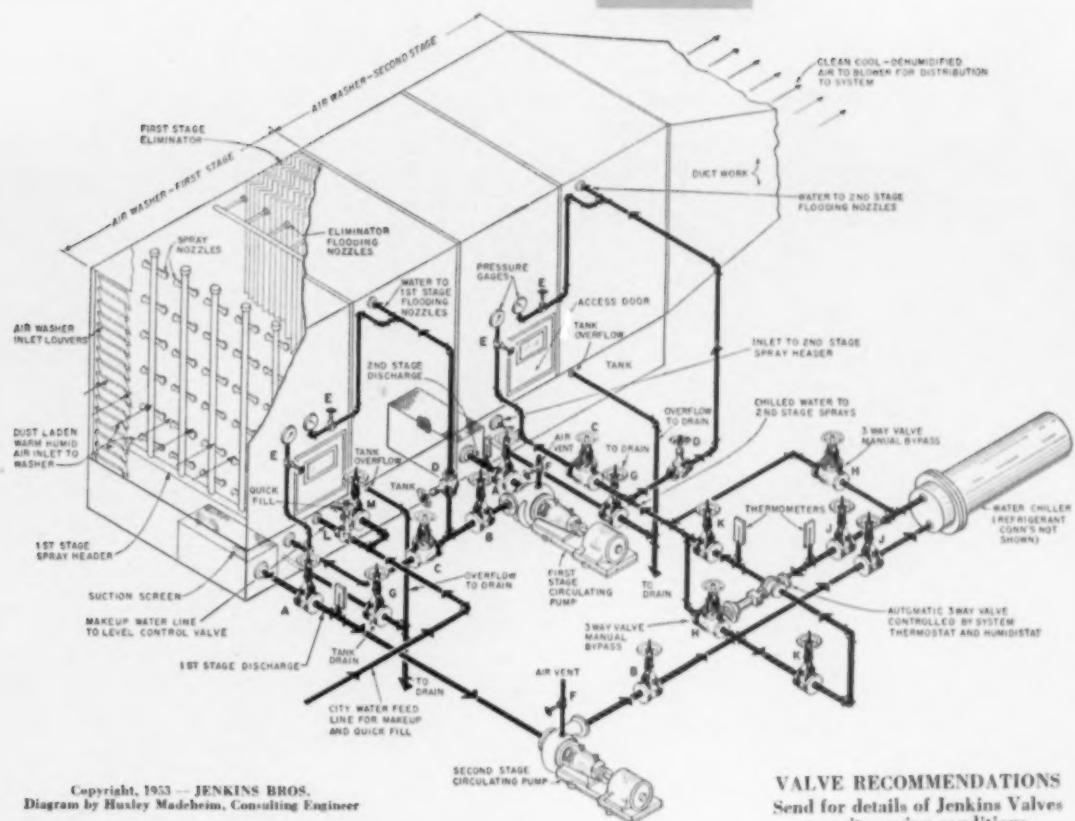
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Air Conditioning

JOSEPH F. DUDDY, MANAGER



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Diagram by Husley Madchein, Consulting Engineer

How to plan PIPING CONNECTIONS FOR AN AIR-WASHER AIR CONDITIONING SYSTEM

The air washer air conditioning system illustrated is a two-stage installation designed to cool, dehumidify and clean air for non-industrial (comfort) purposes.

Water from a chiller, sprayed through second-stage nozzles, picks up heat from the air stream. This water is collected at the bottom of the tank and, still at a temperature below the dew-point of the entering air-stream, is sprayed through the nozzles of the first stage. Here, too, it cools and dehumidifies the air. The water is then pumped back through the chiller and the cycle is repeated.

Excess moisture is removed between stages by a series of baffles which set up abrupt directional changes in the air flow, causing any droplets of water suspended in the air stream to drop out. Separate water spray keeps the baffles wet to collect dust

and dirt from the air stream. Final air condition is automatically controlled by proportionate mixing of chilled and return water by means of a three way valve.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run*. Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 66.

VALVE RECOMMENDATIONS

Send for details of Jenkins Valves to suit varying conditions

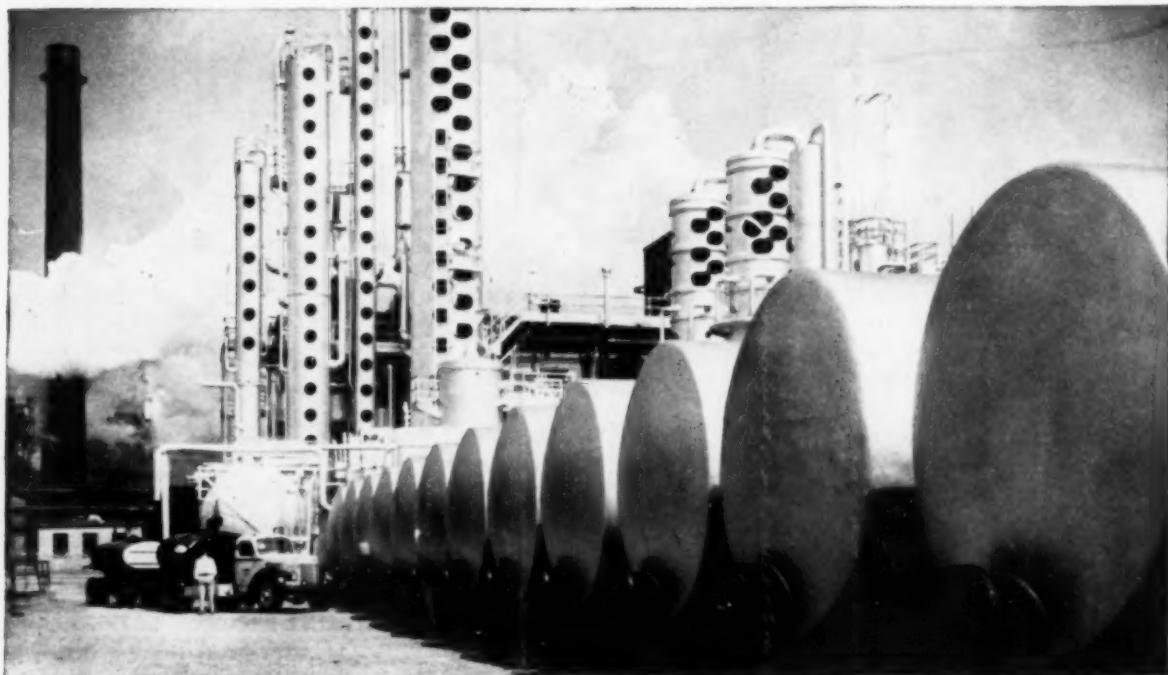
Code	Quan.	Jenkins Valve	Services
A	2	Fig. 651-A, I.B.B.M. Gate	Pump Suction Shut-off
B	2	Fig. 651-A, I.B.B.M. Gate	Pump Discharge Shut-off
C	2	Fig. 142, I.B.B.M. Globe	Spray Header Control
D	2	Fig. 956, Bronze Globe	Flooding Nozzle Control
E	4	Fig. 741-G, Bronze Needle	Pressure Gage Control
F	2	Fig. 741-G, Bronze Needle	Pump Air Vents
G	2	Fig. 651-A, I.B.B.M. Gate	Tank Drains
H	2	Fig. 142, I.B.B.M. Globe	3 Way Valve Manual By Pass
J	2	Fig. 651-A, I.B.B.M. Gate	Water Chiller Shut-off
K	2	Fig. 651-A, I.B.B.M. Gate	3 Way Valve Shut-off
L	2	Fig. 47, Bronze Gate	Feed to Level Control
M	1	Fig. 651-A, I.B.B.M. Gate	Tank Fill Valve for Start up

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Previous attempts to clean the tanks by sand blasting had not been satisfactory. And there was particular difficulty in cleaning behind the overlapping plates of one riveted tank.

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Tank cleaning, including removal of paint from external surfaces, is just one of hundreds of applications for Dowell Service using chemicals for maintenance cleaning. For complete information and estimates on the cleaning of your equipment, call the nearest Dowell office, or write directly to Tulsa, Dept. G-26.

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